

Space activities, environmental pollution and international responsibility of governments

Reyhaneh Mohaghegh ^{1*}, Afshin Zargar ²

¹M.Sc.student of international law, Faculty of Law & Political Sciences, Islamic Azad, University, Karaj Branch, Karaj, Iran.²Ph.D. Assistant Professor and Faculty Member of Faculty of Law & Political Sciences, Islamic Azad, University, Karaj Branch, Karaj, Iran.

Correspondence: Reyhaneh Mohaghegh, M.Sc.student of international law, Faculty of Law & Political Sciences, Islamic Azad, University, Karaj Branch, Karaj, Iran.

ABSTRACT

By sending the first satellite in 1950s, the space era began. The activities of governments around the earth only did not make peaceful use of it, but also contaminated the environment and space of the planet. The history of international space law development suggests that, at the time of five space documents development, the environmental issue and the international responsibility of governments in protecting the environment were beyond the subsidiary structure. Since the space is very important for governments and it provides humanity with the applications and capabilities such as business, economics, communications, remote sensing, meteorology and so on, and future generations also have the right to exploit the environment, in order to prevent pollution from space wastes, the commercialization of outer space, harp systems, chemical pollution, etc., there are several ways in which there can be effective use of environmental principles such as approval of new documents, establishment of the environmental damage association and the establishment of the Space Agency.

Keywords: outer space, Space Activity, International Responsibility, Environmental Issues, Environmental Threats.

Introduction

Human progress in acquiring new technologies over the past half century has given access to space and exploitation of this environment. By sending the first satellite in the 1950s, the era of space began, an era associated with activities such as space competition, space exploration, space technology, and communications and information advances. In October 1957, the first Soviet-made moon called Sputnik 1 was conducted. Spontaneous space activities have expanded rapidly since Sputnik 1. In fact, at the beginning, few states were able to operate in space, but more and more governments entered the field. The increased number of government activities around the earth and human made objects not only does not result in peaceful use of it, but also the ineffective consequences of its use also causes damage to the earth environment and its residents.

Various uses of space such as television programs, widespread banking services, weather forecasting, natural disaster management, surveying, audiovisual programs, sailing, ATMs, the Internet, and other space applications all indicate the importance of maintaining the environment and environmental issues for the peaceful pursuit of space activities^[1].

According to the importance of preserving the space environment in order to continue the space activities and benefiting the future from this environment, this study seeks to answer the questions how the state's activities in the earth environment have an impact on the environment and what is the responsibility of governments in this field? What are the pollutants of space? What are the approaches and challenges in environmental protection? Therefore, in this study, first, the causes of the attractiveness and importance of space and the most important uses of the atmosphere beyond the atmosphere, which will increase the space activity and the contamination, will be presented and then the most important contributing factors to the space is discussed. In the next section, considering the importance of the international responsibility of governments in protecting the environment and preventing pollution, five space documents were examined and the most important challenges and issues will be addressed and the proposed solutions will be discussed. Finally, conclusions will be drawn.

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Outer space and government activities

Space activities that include all activities carried out in outer space, the moon, and other heavenly masses, must be fully peaceful, in accordance with international treaties, especially the outer space treaty. Such activities in the exploration and use of outer space, including the moon and other celestial objects, should be conducted based on the interests of all countries, regardless of their degree of economic and scientific development, and should be presented for all human beings. Today, the international community benefits from space services and applications; these applications are the reasons for the attractiveness of space for governments and activities in this area. With the increasing activity of governments in space, we can observe the environmental impacts on space and the environment. Therefore the importance of the attractiveness of space and then the most important uses of outer space, which increase the activity of governments, will be addressed.

The importance of space and its attractiveness reasons for governments

For following reasons, space activities are attractive and important for governments and decision-makers: 1. Promoting military and civilian capabilities; 2. Science exploration; 3. Facilitating and accelerating communications that can be linked to any place in the world; 4. Wise and prosperous international scene; 5. Control, monitoring and identification of goals and actions; 6. The reduction of dependence on other countries 7. Strengthen national and counter soft and tough security threats, especially in the form of satellite, military threats and spy programs ^[2].

In other words space is of great importance for the following reasons:

1. Commercial, economic, communications and welfare facilities for nation's services. 2. Remote sensing. 3. Better management and supervision of traffic and transportation. 4. The possibility of human communication with each other through telecommunication satellites, especially for remote areas, where there is no possibility of establishing terrestrial communication networks. 5. Governments assistance against threats including terrorist threat, economic crisis, health issues or rapid population growth, and massive migration to cities in some countries.

The most important applications of outer space

1. Military-security applications

The fact is that for a long time the space activity of countries has paid special attention to military dimensions, and according to some futures studies in the 21st century (and given the current state of space competition) space activities will be more relevant with military and war ^[3]. The military application of space can be drawn in two main parts: first, space serves the purpose of supporting and reinforcing military operations and planning as an

accelerating factor, thus increase the effectiveness of defense and security forces; second, space can be considered as an area for direct military actions ^[4]. Hence, there are a variety of military satellites, satellite imagery, maritime surveillance, alert, radio eavesdropping, intelligence, tracking, military navigation, telecommunication, military weather, military science satellite and anti-satellite satellites ^[5].

2. Remote sensing

Remote sensing is carried out by institutions, organizations, or individuals who use remote sensing systems and data to enhance public welfare. Environmental and humanitarian applications and other applications, including monitoring of transactions, can be considered as remote sensing applications. Also, remote sensing satellites can pursue a scientific goal. Satellites that are used exclusively for exploration ^[6].

Remote sensing satellites are used for land surveying and climate change, prevention of natural disasters and exploitation of natural resources. It is also possible to see the deformation and disappearance of the ozone layer as a protector of the earth against the dangerous rays of the sun through these satellites ^[2].

Meteorology

Meteorological satellites are placed on the Earth's orbit and are instruments that provide the ability to study weather maps and weather forecasts, and complement the ground-based network of weather stations. The ability of these satellites to observe the state of the atmosphere of most points of the Earth's surface encompasses weather information in various regions. In addition, weather satellites have the ability to warn against tropical storms, tornadoes and extreme temperatures, especially in areas such as the oceans, remote areas, as well as in many developed countries, which ground networks can not fully cover them. On the other hand, these satellites also operate in the form of a search and rescue system, and such an operation is affected by equipment that can detect warning signs such as those found on aircraft and ships. The land cover of these types of satellites is used to control climate change ^[2].

3. Communication and telecommunication applications of space

Telecommunications is one of the oldest and most prominent satellite approaches in the military and civilian arena. Today, telecommunication is seen as a pivotal point from a military point of view. With satellite communications (SATCOM), the ability to communicate with armed forces around the world is provided better than any other alternative system ^[4].

As stated, beside military applications, telecommunications have nonmilitary applications. In fact, telecommunication satellites have a remarkable effect on the ability of people to communicate with each other, especially for remote areas, for which there is no possibility of establishing terrestrial communication networks. Most communication satellites are in the geostationary

orbit that support video, information, and audio services, and a substantial amount of communications satellite capability in this circuit will continue for many years.

4. Commercialization of outer space (commercial applications of satellites)

Another space application is commercialization and commercial exploitation of outer space. Commercial activities from space means the use of space for commercial purposes, which can include uses such as telecommunications satellites, global positioning systems, as well as human activities in space such as space tourism, orbital production, knowledge of gravity and research and development ^[7].

It is worth noting that commercial activities and commercial exploitation of outer space should have the following characteristics: 1. They should be in the framework of peaceful use (Article 1 of the Space treaty). 2. Commercial exploitation by the private sector shall be subject to the subset of state-owned and state-controlled institutions. (Article 6 of the Space and Materials Clause 12 and 14 of the treaty) 3. Commercial exploitation of outer space by the private sector should be consistent with the principle of non-ownership of space. (Article 11 (2) of the space treaty). 4. Commercial exploitation of outer space should be in accordance with the principle of common interest of all humanity (Article 4 of the treaty).

5. Global navigation systems

The Global Navigation Satellite System is a navigation system that analyzes the speed and timing data for inactive and three dimensional weather. Initially, the system was used for military purposes, but now it is used for many civilian purposes, including the location and navigation of aircraft, ships, trains, cars and fleet management, as well as satellites and many fishing, agricultural and emergency jobs. The system can be used to track people, including children and criminals ^[6]. An example of a satellite navigation system is the US system called the Navy or Global GPS Finding System, which uses a combination of 16 satellites ^[4].

Environmental effects of space activities

Since 1957, with the human passion for exploration of space, a new field of human activity has begun, and the exploitation of the oceans has shown its immense effects to the international community, including economics, lifestyle and the environment. While space travel has made remarkable progress for humanity over the decades, but we witness an ever-increasing expansion of space-related environmental problems, thus this has drawn the attention of the community of law and the global space community to the pollution of this area ^[8]. In fact, as much as we are concerned about the sustainability of life on Earth, the same concern has begun to increase with space access as the environment is more fragile and sensitive than the earth environment and similar to the Earth's environment, which is remarkably resilient, the space environment does not have such an advantage ^[1].

The most important contaminants of outer space are:

1. Space waste

Space wastes are often a common name for any type of human made objects that is discarded in space, either in the orbit around a spherical mass or a passage between spherical objects ^[9]. Space wastes include the stages of rocket propulsion, old satellites, detachment fragments, component analysis and collisions, satellites that lost their effectiveness and are no longer used for different purposes. This definition includes fuel leakage, cooling droplets, patches and color posters, very small particles, and particles that go out into outer space while walking, as well as garbage that is thrown away by people in space missions ^[8].

The need to address the issue of space waste can be cited, for example, in the February 2009 crash of the active satellite Iridium33 with a cosmic satellite 2251 and with the formation of clouds of space waste, which highlights the issue as an environmental hazard ^[1]. The importance of space-based waste has led governments to focus on identification, reduction the growth and harvesting space gases ^[10].

The first steps were taken to identify and anticipate ways to reduce the amount of space waste in the 1960s by the National Aeronautics and Space Administration of the United States (NASA), and the first results of these actions were presented in the international community and mainly at the Safety and Security Summit of International Astronautical Federation (IAF). Then, in 2007, Kupus issued guidelines for the reduction of space wastes. These guidelines included major proposals for reducing space waste, including: 1. limiting the release of garbage during space operations. 2. Minimizing the disintegration of materials during different stages of space operations. 3. Avoiding deliberate destruction and other harmful activities. Moreover, the Russian Space Agency in Russia, International Organization for Standardization in the UK and the European Space Agency for European union members monitor space wastes ^[11].

About the space gases issue, the fifth European conference concluded that "the implementation of active discard measures is needed to provide sustainability, and there is no alternative for space protection. The NASA Space Waste Management Office member, Nicholas Johnson told Congress that "The emergence of satellite-based collisions could be the main source of new space wastes and the most effective way to limit satellite collisions, is to remove inactive spacecraft ^[10].

2. Chemical pollution

Chemical contamination occurs as a result of artificial or accidental release of chemicals or collisions and events in outer space. The chemicals may be released in space as part of the operation inadvertently. For example, the exhaust of missile fuel that is used for outer space, produces a hydraulic acid in space, which causes the ozone layer to weaken and leads to adverse effects on the airspace ^[12].

3. Radiological contamination or radio radiation

Radioactive contamination results from the emission of electromagnetic and radioactive waves. The origin of radioactive contamination is the continuity of very high laser radiation frequencies and the emission of microwave waves, which produce electromagnetic waves. Nuclear tests in space and the returning the space objects to earth without control or supervision, which bring energy or nuclear power, create important environmental hazards ^[12].

The connection between the environment and the space environment means that any damage to the environment of the space will also result in damage to the earth environment. For example, in the case of the 954 spacecraft, it has been proven that the spacecraft that worked with nuclear energy, disintegrated during its movement to the earth and spread large quantities of radioactive material throughout Canada and caused a lot of unused lands ^[3]. Therefore, the danger of returning objects to earth orbit is not merely a physical hazard, but also a radiological contamination of the environment.

4. Harp systems

Harp systems are used for power and energy transmission without loss of power, climate control, artificial clouds and rain, medical and therapeutic applications of mental illness, battery charging for satellites and so on. Although the system has positive features, but it is also used for military activities, hurricane, flood, disturbance in radio communications, drought, and so on. Harp systems are a serious threat to the environment. Among them is the impact of the system on the earth warming, as it sends more damage to the ionosphere by sending more energetic particles due to nuclear explosions ^[2].

5. Pollution from biology

Contamination from biology may occur in nature in the previous or later form. Transportation of all types of microbes or bacteria into outer space, whether by accident or by subjection, or for practical testing, causes the generation of contamination in the outer space. But the next pollution is to bring all kinds of microbes and bacteria from outer space to the internal airspace of the planet, and this may occur after the return of the astronauts and the recapture of spaceships and bodies of the planet ^[12].

6. Solar energy satellites

Another source that can exacerbate the environmental risks associated with space activity is solar power satellites. When transferring solar energy to Earth's surface, this energy can not only damage the ozone layer, but it also has detriment effect on the Earth's surface. In addition, this energy can be very effective in creating electromagnetic disturbances in air navigation systems in outer space. There will also be concerns at the surface of the earth, because it's long-term effects on humans and on plants and animals will be very significant ^[8].

7. Electronic attacks by parasites

Electronic attacks by parasites are other threats that prevent audio signals from receiving signals and even act as sources of disturbance to the broadcast of some networks. In addition to the vulnerability of all military and civilian satellites to noise, human health is also endangered by these attacks ^[2].

8. Outer space commercialization

One of the activities that has been considered for humans since the beginning of space access is the issue of commercial exploitation of this region of the universe. Commercial activities and commercial exploitation of space means the use of space for commercial purposes, which may include uses such as telecommunications satellites, global positioning systems and also include human activities in space such as space tourism, orbit products, low gravity thrust ^[13].

In recent decades, commercialization of space has also resulted in complex challenges, including the protection of space environment ^[14].

9. Pollution from space transportation

Pollution from space transportation causes serious environmental damage. These types of contaminants that are left out of the exhaust gases of launch vehicles create cloudy garbage, cloudy terrain and radioactive contamination, which in turn endanger the environment of the earth. In this way, the clouds of garbage from the accumulation of pollutants in space, in addition to reducing the field of view of satellites and disturbance in telecommunications, the superconductor, which is the result of the gas from the rockets of the spacecraft and dust, is a threat to the ozone layer. Radioactive contamination from various sources, such as unsuccessful launching of space objects, or collision of space shipments with space objects and garbage, is another contributing factor to the adverse effects of the object entrance to the Earth's atmosphere ^[2].

10. Research and space experiments

Another major source of environmental pollution in outer space is space exploration in outer space, which can be divided into military and military sections. Despite the disarmament conference held in 1979 to establish a multilateral international system to prevent the deployment of research and development in outer space, the concept of opposition to the 1977 OAU Convention on the Prohibition of the Use and Exercise of Nuclear Weapons and other weapons of mass destruction, represent the legality of conducting research and testing on conventional weapons, military satellites and ballistic missiles. Since these experiments have not been successful in some cases, they cause partial explosions in space, and therefore they are considered as one of the major sources of environmental pollution ^[10].

International responsibility of governments about the earth environment

Since the international responsibility of governments in protecting the environment and preventing pollution is so important, so we investigate the issue with respect to the five scale space documents.

The treaty related to governing principles for the activities of States in the exploration and use of outer space, including the moon and other heavenly bodies

Though in the 1967 treaty, many have direct and indirect links with the environment and international responsibility, such as 4, 6, 7 and 11 clauses, these are faced with challenges. In fact, these materials, in conjunction with the grave environmental impact of the "global mass", along with the national territory, have foreshadowed the way for resorting to the fact that, in the event of the occurrence of damage from any object of space to another, the nature or citizen persons, it is possible to cite the responsibility of the thrower country. But yet, this was not tested. This article states that the members of the space activities are required to inform the Secretary-General of the United Nations as far as may be necessary to disclose the potential or actual danger ^[15].

Article 9 also refers to the concern about the protection of the environment as a concern for biological contamination and addresses the constraints on space environmental aspects and requests governments and countries to make the necessary arrangements in their space activities, in order to prevent any harmful and maladaptive changes by adopting appropriate requirements, but despite the emphasis in Article 9, countries do not show any particular interest in consulting each other in relation to space activity, in order to make each other aware of the potential consequences of space environment. Accordingly, although counseling can provide a positive potential for the protection of the environment, but in practice it is being treated with very little credibility from governments. A state can acquit itself to the extent that it does not know the excuse of not being aware of the potential threats to its activities, information and consultation with another country ^[16].

The weakness of the treaty therefore is related to a negotiation, which, even if it has been provided, there is no certainty as to the desirable outcome to be shared by all member states ^[15].

An agreement to save astronauts and restore thrown objects into outer space

The agreement provides a specific way to help endangered space explorers who might be victims of problems, including environmental problems.

Clause 4 of Article 5 of this Agreement stipulates that if a State Party has "a reason to believe that a space object or its parts have been found in the territory of that country or elsewhere by another country and it has a precarious nature or it is harmful, so it is necessary to notify the thrower government to take effective measures to eliminate potential danger as soon as possible.

The preceding statement states that the thrower must take effective steps to eliminate the damage caused by the space object in the land of each member state that is subjected to risk.

Therefore, "If an object is discovered in an area outside the territory under the sovereignty of a country, for example, in space, or that dangerous object is not obtained by a member state, then there is no obligation to eliminate possible danger and harm." This statement rejects the application of pollution-related regulations through waste in space ^[15].

Convention on International Responsibility for Damage of space masses

One of the challenges and worries that exist when discussing the environmental damage caused by space activities are duties and responsibilities towards it. George Hackett, a professor and author of international law, wrote in the Space Waste Book that these two terms may be used alternately. In general, it can be argued that state responsibility is the responsibility of a state to violate an international obligation, while liability is a general reference to the treatment and repair of damage, whether it is derived from international breach or so on ^[17].

In a general principle of the 6th Outer Space Treaty, governments are required to fulfill their international obligations in relation to their space activities, whether such activities are carried out by government agents or by non-governmental entities. Article 7 also specifies the international responsibility of the sending the plains by states (a state that launches an object launches an object from its territory or facilities).

Article 2 and 3 of the Outer Space Treaty also deal with the subject of the treaties responsibility of States Parties. However, the liability convention diverges from the general provisions of Article 7 of the outer space treaty, and distinguishes between two types of responsibilities (treaties), namely, "sole responsibility and liability for errors" according to the circumstances of each incident and the damage caused by the object. In this regard, the convention provides that the thrower country has a "sole responsibility" to compensate for the damage caused to the aircraft by the space object on the ground or in space. This convention embodies the supposed principle of the principles found in many legal systems in which a person who creates a particular situation, wherever possible, creates a real or catastrophic risk without any proof or necessity to prove fault or failure, is obliged to pay compensation, provided that the actions taken to cause the damage are dangerous (liability due to danger). If, at a location other than the earth's surface (for example, the space object of another thrower country, or to persons or property in it, is damaged by an object thrown into space, Article 3 of this Convention stipulates that the thrower's country of this space object will be liable only if the damage is due to the fault or failure of that country or its dependent and responsible persons. This means that the occurrence of events in the orbit due to the waste has never been carefully and satisfactorily examined, which is an issue in this regard ^[18].

Lastly, in the Liability Convention, although we are faced with debates on liability for the damage caused by space objects, only Article 21 can be considered as an interpretation of the environmental consequences and the responsibility of space activities, which does not state the necessity to responsibility explicitly. It also refers to appropriate action and assistance to the affected country, if it expresses its request ^[19].

Convention on the Registration of Launched Objects in Outer Space

The registration convention is also indirect in relation to environmental problems and related international responsibilities in the use of outer space.

The primary purpose of the convention is to facilitate the identification of the object that caused the damage to occur ^[15]. Although the Convention is confronted with issues like Articles 2, 4, 6, and etc., about the environment and responsibility, the convention also has problems. The fundamental problem is that the convention only captures integrated space objects. So that when they are sent to space, it does not provide significant assistance in cases where, for example, damage and damage to a small piece of waste generated from a satellite is not provided. In addition, it does not necessarily state the possibility of a transfer of ownership of outer space objects. Undoubtedly, all these deficiencies prevent the identification of space objects and hazardous waste and, consequently, it is difficult to identify the responsible state ^[19].

Consensus on government Activities on the Moon in Other Celestial Masses

In the case of the Moon Agreement, only the article expressing explicitly the responsibility and the environment is Article 7, which states in the first paragraph, that member states should avoid harmful pollution and harmful changes to the outer space. Governments must operate space objects that work with nuclear power sources to prevent radioactive contamination from using these resources to safe orbit (an orbit where radioactive materials have sufficient time to eliminate and transform into levels) ^[20].

The second paragraph of this article states that "States Parties are required and obligated to inform the Secretary-General of the actions they are taking, in particular with regard to the radioactive material that they are alleged to be notified in advance. A similar warning is observed about the phenomena that may endanger human life and health in Article 5, paragraph 2. Moreover, in order to avoid collisions caused by simultaneous operations in the area or in similar orbits around the moon, the Moon Agreement required a special, albeit limited, requirement. The agreement stipulates: "If a Member State becomes aware that another member is attempting to simultaneously operate in the same area or orbit around the moon or the risk of moving to or around the moon, they shall promptly notify the other of the time and schedule of action ^[15]. This requirement, although limited, clarifies the responsibilities, but with a deep look at the

agreement, we are only focusing on general environmental protection and the responsibility of the countries is diminishing.

Major Challenges, Problems and Responsibilities of International Governments on the outer space environment

According to ever increasing activity of space activity and the challenges expressed in the field of environmental protection and international responsibility, we face with the following issues:

- 1- Lack of desirable methods and knowledge about the pursuit and elimination of chemical and biological and waste in space.
- 2- The rules of international law are not sufficient and satisfactory to protect the space environment, and the rules are vague and inadequate, and we are faced with the weakness of the current legal system governing pollution in the space^[1].
- 3- In international documents on environmental protection of outer space, the precautionary principle has not been addressed.
- 4- Over the past few decades, after the adoption of international instruments in the area of supra-jurisdiction, none of them have established specific rules for the protection of the environment in the field of commercial activities of exploitation or use of natural resources on the surface of the moon or other celestial bodies. In fact, there was no general convention on the protection of the environment beyond the outer space ^[10].
- 5- Lack of attention to the principle of joint but different responsibilities in the context of government commitments to protect the environment beyond the outer space.

The principle of joint, but different responsibility is one of the principles of international environmental law that derives from the concept of the common heritage of humanity and the joint responsibility of countries to protect the environment while, at the same time, their various obligations, taking into account the conditions and the different and specific circumstances of countries, emphasize the environmental problems and their technical and environmental capabilities to address environmental problems that need to be incorporated in the outer space environment ^[10].

- 6- Lack of adequate attention to international liability arising from the prohibition actions in international law.

Considering the adoption of the draft text on the prevention of transboundary damage caused by hazardous activities by the International Commission in 2001, whose materials relate to international liability for non-transboundary damage, the damage to the outer space environment has also additional importance, and it is necessary to find a solution about it ^[10].

According to the stated issues, the following solutions can be found to address the issues and improve the protection of the outer space environment and the international responsibility of governments in this regard:

- 1- As space rights are newer than other international rights, in addition to the adoption of new documents, some other documents also need to be reviewed, as well as new

international obligations should be established on the space waste removing from orbits by governments.

- 2- It is necessary to create incentives for the elimination of pollution in the space by creating a specific mechanism, such as partnerships provision between the non-profit sector and the government.
- 3- More attention should be given to preventative environmental protection of outer space ^[1].
- 4- Another effective way is to use the environment principles. In fact, since the responsibility for the protection of the Earth's environment has been applied through the fundamental principles of the environment, in order to improve the environmental protection of space and the international responsibilities of governments in this regard, these principles should also apply to space: 1- The principle of state commitment to environmental protection 2- The principle of joint but different responsibility in environmental protection 3- The precaution principle in environment protection 4- Principle of commitment to cooperation, information and assistance in environmental emergencies. 5- The principle of the obligation to pay compensation from environmental polluters. 6- The principle of communication with the common biosphere 7- The principle of good neighborliness 8- the preventive measure principle 9- the sustainable development principle ^[21].
- 5- The establishment of International Space Agency is another proposed solution in this regard. In order for this proposed organization to act effectively and successfully as a facilitator, a clearly defined mission and task must first be defined and the limits of authority and jurisdiction should be identified. The bureaucracy should also be minimized through the establishment of an efficient secretariat, which is the coordinator of legal, technical and scientific issues. The organization should have the authority to investigate the impact of space activities on the environment and it should be possible to provide recommendations in the relevant regulations in international agreements ^[1].
- 6- It is necessary that the countries that carry out space activities, especially the leading and powerful countries in this field, are seeking to create a fund called the Environmental Damage Fund with the participation and international cooperation and the establishment of an international agreement. Moreover, each member of this fund should pay an annual specific amount of money in this fund so that when damage occurs to a country due to space activity, irrespective of finding the main responsible of this damage, specific amount of money is paid to this country.
- 7- It is suggested to create a specialized court that deals solely with environmental crime caused by space activities.
- 8- Countries can work together and participate in the process of gathering a number of inventors and provide financial and technical resources to invent environmental devices and clean up space pollutions. For example, they can build more advanced space waste collection devices.

9- In the space organization of each country, such as the Space Organization of our country, it is suggested to provide a separate section with experts to handle and protect environmental issues ^[21].

10- Establishing a new legal system through the ratification of the Framework Convention and the Additional Protocol.

The space environment convention should prohibit the harm to the environment, as it is consistent with the "Sustainable Development Principle" recognized in the Stockholm and Rio Declaration. In addition, considering the possible and practical solutions, these rules should not be ignored in the domestic laws of the countries. Therefore, using this approach, a specific legal system can be created in this particular context. Initially, the obligations formed are non-existent rights, which in turn makes to impose strict rules as a result of the failure and stalemate of the achievement of this legal system. In addition, governments try to fulfill the obligations of these non-binding rights in order to prove their suitable intension and provide a positive image of themselves to the international community and, therefore, are satisfied with the rules of their behavioral guidance ^[1].

Conclusion

Human access to outer space is one of the most important developments in space technology. Space has been attractive to governments because of the many capabilities and applications that provides for human, such as commercial, economic, communications, remote sensing, weather, military and security applications, and so on. In fact, today, space has attracted many attention in terms of economic, legal and, most importantly, political-security aspect at the international level, and has led many countries to find that they should spending a lot in scientific, industrial and national power to attend in this area. Following this interest, we witness an increase in the space activities of governments in outer space, such as the deployment of communications satellites, meteorology, military, remote sensing and etc. in earth orbits, which, in addition to the outer space environment, it also has an impact on the Earth's environment. In fact, these activities are confronting us with pollution, which, for example, affects the Earth's atmosphere, causing damage to the ozone layer or leads to climate change such as global warming. These contaminating agents, including waste, space, chemical pollution, radiological contamination, Harp systems, commercialization of outer space, space research and experiments, etc. are increasing in widespread manner. According to the reduction of these environmental degradations and pollution, we need international cooperation and responsibility, so that when we look at international responsibility with regard to the five space documents to reduce these pollution and environmental degradation, we find out that not only there is no any environmental specifications and regulations about protection process, but also there is no clear and transparent picture of international responsibility for protecting the environment. In fact, the legal space policy is

scattered and violated, and it includes general principles and cannot address the questions of the increasing use of states from space. On the other hand, in the interpretations, one of the most important challenges and drawbacks is the lack of attention to the precautionary aspect of environmental protection beyond the outer space, the lack of consideration of the principle of joint responsibility but different in the context of the obligations of governments in protecting the outer space environment, the absence of a general international convention on the protection of the environment beyond the outer space, the lack of adequate attention to international liability arising from unauthorized acts in international law, etc.

Given the challenges and difficulties posed by environmental protection and international responsibilities, solutions can be found, such as:

1. In addition to the approval of new documents, some documents must also be reviewed.
 2. By creating a personal mechanism, such as partnerships provision between the non-profit sector and the government, it is necessary to motivate them to eliminate pollution in space.
 3. More attention to the precautionary dimension of environmental protection of overseas space.
 4. Effective use of environmental principles
 5. Establishing a new legal system through the ratification of the framework convention and the additional protocol.
 6. Establishment of International Space Agency
 7. Creation of environmental damage fund.
 8. Creation of Specialized Environmental Crime Tribunal
 9. Consideration of the special section in the space organization of each country for environmental issues.
 10. The use of inventors for the invention of devices for protecting the environment and cleaning the outer space.
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