

Legal Protection of Outer Space from Environmental Pollution by Military Use (Nuclear Explosive Experiments)

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The principle of non-pollution of the outer space environment is one of the legal principles and norms governing the activities of States in outer space contained in the text of article IX of the 1967 Outer Space Treaty and is therefore a rule of international law. International environmental issues such as where States launch space activities which introduce harmful substances, nuclear energy sources into the atmosphere or conduct unlawful material acts involving nuclear explosions or collisions in the outer space environment, have or are likely to have adverse effects, such as damage to the Earth and its surroundings. This research seeks to determine the dimensions and implications of military use and nuclear explosions on the outer space environment and the role of national laws and international treaties in protecting the outer space environment to counter the harmful effects of pollution.

Introduction

The environmental pollution of outer space is one of the most serious contemporary international environmental issues. States that launch space activities by introducing any harmful substances, nuclear energy sources or carrying out illegal physical activities such as nuclear explosions or collisions in the outer space environment have or are likely to have consequences. Adverse effects, such as: damage to the Earth and its surroundings; the disruption of space activities, including telecommunications, scientific research and other peaceful activities of other States and impaired validity of legitimate space orbits around the Earth is the focus of this research. International states are free to use and exploit space orbits, in accordance with the principles of international law, the Charter of the United Nations and space law and environmental, terrestrial, oceanic or space orbits, in accordance with the text of Principle II of the 1992 Rio Declaration. (Rio Declaration, 1992)

The importance of the study:

1. The study deals with an important topic which is polluting the environment of outer space and the means of combating it from a legal perspective.
2. The importance and seriousness of the study is determined by the fact that it does not recognize time limits or spatial limits.
3. This study is one of the most recent studies dealing with mechanisms to combat pollution of the outer space environment.
4. The contribution of this study:
 - The identification of national and international legal mechanisms
 - The combat plan for the phenomenon of pollution of the outer space environment.
 - The possibility of reviewing the procedures and policies taken by various systems and activating the provisions of international treaties and conventions and drafting them in a legislative template to eliminate various crimes of pollution of the outer space environment.
- 5 - It also shows the importance of the practical issue through its findings and recommendations and documented theories and opinions of researchers may benefit specialists and practitioners in this field, as well as specialized agencies in rebuilding a comprehensive strategy to reduce this phenomenon.

Study Objectives:

The Aim of the study is to highlight the role of legal protection of outer space from environmental pollution by military use of outer space through the following:

- Identify international and national endeavors to determine the concept of pollution of the outer space environment.
- Detect causes and effects of pollution of the outer space environment by highlighting the concept of military uses of outer space.
- Highlight mechanisms that help to reduce nuclear testing through the application of the provisions of international treaties.
- Present recommendations in the light of study results which promote space protection from military use of nuclear testing mechanisms, by reference to the application of the provisions of international treaties.

Methodology:

The research used descriptive analytical method.

Search problem

Penetration of the human environment of outer space through the exercise of various military and civilian activities requires international attention that sheds light on the dimensions of this human intrusion on space:

- What is the impact of military use and testing of nuclear explosions on the environment?
- What is the role of national laws and international treaties in protecting the outer space environment from pollution?
- How effective are the mechanisms for combating military uses and nuclear explosive testing in the light of international laws and treaties?

First topic: international and national efforts to define the concept of pollution of the outer space environment

First requirement: the definition of the outer space environment

Scientifically, aerospace is defined as "everything that lies behind the Earth's atmosphere or, in other words, everything that lies 320 kilometres above sea level" (Kanar Sami. 2001, p.2). The space surrounding the globe can be divided into three sections: the atmosphere or outer space, the area between the atmosphere and the moon (Moon), and finally cosmic space (Cosmic Space). Aerospace consists of several layers, each layer has physical and biological properties that distinguish it from outer space, and these layers include: Troposphere extending at an altitude (10-20 km) and above this layer is the stratosphere and up to this layer is very important because it represents the ozone layer (O₃), which protects life on Earth from the ultraviolet rays coming from the sun. These rays convert oxygen gas (O₂) to ozone gas, and consume this process ultraviolet radiation. This layer is in a state of continuous renewal, ozone is inversely converted to oxygen, but oxygen is more ozone due to the energy of ultraviolet radiation (Salah Labidi, 1994, p.8).

The Mesosphere stretches to an altitude of 80-95 km, in which combustion of meteorites falling from space occurs (Asad Akarawi, 1996, p.2-5) and the Thermosphere layer extends from the height (85 km) above and in the upper parts of this layer conversion process begins by X-ray and consists of, in this layer, electron loss in sufficient quantities to make the ionosphere layer reflecting radio waves, created from the ground. These waves are not lost in outer space and are therefore essential for communications in the technological community (N.H. Langton, 1969, p.101). The last class (Exosphere), starting from a height ranging between (500-600km) to (16000-8000 km), extends and overlaps celestial bodies and then there is outer space (mekail abdelahod, 1977, p.234). The definition of the outer space environment (The Outer Space Environment) is those places (Regions) surrounding the Earth, where satellites can be taken in its orbit and have a minimum height of almost 100 km.

Second requirement: international efforts to define the pollution of the outer space environment

• ***Definition of pollution of the outer space environment in international instruments***

In fact, a definition of pollution in terms of its contamination of outer space environment in all outer space treaties, as well as in the declarations and decisions of outer space affairs of the United Nations, does not exist. In the Outer Space Treaty of 1967, which governs the activities of states in outer space, including the Moon and Other Celestial Bodies, a legal text that defines the intended environmental pollution of outer space does not exist however there is identification of pollution sources to outer space environment and its causes. It is stated in the text of Article IX, the obligation of States parties, that it is necessary to avoid the occurrence of any harmful contamination of outer space, as well as any adverse changes in the ocean of our planet or its environment with non-terrestrial materials. Also banned are experiments of any kind involving weapons on the Moon and Other Celestial Bodies.

The sources of pollution of the outer space environment and the reasons set forth in the text of Article IX are activities or experiences that cause harmful pollution of outer space and the changes that damage space objects surrounding the Earth or the Earth itself. Moreover, nuclear weapons and weapons of mass destruction are forbidden and if placed in orbits around the Earth or the moon or any other space this is as crime as contained in the text of Article IV. As well, any parts scattered both above ground (on the territory of another State) or in airspace or outer space from sources of pollution that entails international responsibility (Outer Space Treaty, 1967) are included as outer space and are an object of this treaty. Additionally, the General Assembly recommended in its resolution No. 52/56 of 1997 "to give more attention to all aspects relating to the protection of the outer space environment and conservation, particularly those aspects that have an impact on the Earth's environment" (resolution No. 52/56 of 1997).

The Moscow Treaty of 1963 banning nuclear tests in the atmosphere and outer space and under water, it has indicated in its preamble to "put an end to the pollution of the atmosphere and the ocean where human lives". It also announced its primary objective, which is to put an end to the race for or armament production or testing of all types of weapons, including nuclear weapons, and to stop nuclear weapons testing explosions (Moscow Treaty, 1963). Article 1 stipulates that each member of this Agreement shall undertake to prohibit, prevent and not conduct any test of a nuclear weapon or any other nuclear explosion anywhere under his or her authority in outer space.

However, this treaty did not recognize the pollution of the environment, but rather mentioned the causes of pollution resulting from nuclear explosions that cause harmful radioactivity. The United Nations General Assembly Resolution No. 1884 of 17 October 1963, in which the General Assembly called on the international community to refrain from placing any nuclear weapons or with total destruction in outer space, the resolution did not define the pollution of the outer space environment, but identified the causes of pollution. Thus, the principle of non-pollution of the outer space environment is an international obligation, as stated in the international instruments on outer space affairs and should be protected and prevented in the interest of all States.

As such, this principle is a rule of international law whose breach entails international responsibility for damage to another State or the space activities of other States because of action or inaction for the pollution of the outer space environment.

- ***Definition of pollution of the outer space environment in the Buenos Aires Space Debris Document:***

It should be noted that the definition of the term "pollution / squirmed / Contamination-Pollution", has been stated in the Buenos Aires International for the protection of the environment from damage caused by space debris, a draft international convention prepared by the Space Law Commission of the International Law Society (ILA) in Sixty-sixth Conference in 1994. In the text of Article 1 (a) (b), paragraph (a) states that "pollution / pollution", for the purposes of this Instrument, "means human modification of the environment by the introduction of undesirable elements, or by unwanted use of these elements".

The responsibility for the pollution of the outer space environment and modified ecosystem of outer space, is the result of human use and so there must be a legal organization addressing this behavior with the objective to limit the damage to this area. The definition thus must include two pollution factors. First, it is either through the introduction of undesirable elements into this environment, such as nuclear test residues, radiation from nuclear power sources, space objects, remnants or parts after they crash, or any other element of outer space pollution. The increase of such space experiments or objects, in violation of the components of the outer space ecosystem, would also have adverse environmental effects, which would have a negative impact on the future of space activity and would damage the space activities of States at present. The other factor determined by the definition is "The Undesirable Use of Those Elements" in the case of increased launch volume and increased number of satellites which cannot be accommodated by limited-use orbits such as the geostationary orbit.

Outer Space is unable to accommodate space-based orbits such as the geostationary orbit, increasing them especially after the end of their effectiveness and if not removed or withdrawn to orbits to clear, they will lead to obstruction of space traffic and result in danger and damage in the event of a collision. The undesirable elements are defined in paragraph (b) as "all harmful elements by including space debris". It should be noted that of all international instruments on outer space issues, this definition is the only mention on pollution and although it is not binding, because it is contained in a draft international document, it is a good initiative to alert the international community to the urgent need for a legal definition of the pollution of the outer space environment.

The definition contained in the draft did not cover all elements of outer space pollution and its causes, as those causes and elements were linked to a result of, technical development.

Third requirement: Definition of pollution in some national space legislation:

A legal provision of the national laws listed below, sufficiently persuasive to evolve into an international rule of law was not found:

Argentina: Article V of the Argentine national legislation establishing the National Register of Objects Launched into Outer Space provides the information to be provided for inclusion in the National Register.

his information includes "the knowledge of the useful life of the space object, the precautions taken to avoid the contamination of outer space, in particular whether it has developed mechanisms for depositing a space object at its useful life, and the expected date of fragmentation, recovery or loss of contact with the space object"(Argentine National Decree No. 125/95). Article V of the Argentine legislation included measures to avoid any harmful pollution to Earth's orbits. Knowing the operational life of a satellite and determining the mechanisms for moving a space object from its orbit when its orbit expires to other orbits is one of the measures necessary to mitigate the presence of space debris (inactive space objects) in orbit.

As regards the Ukrainian Law on Space Activities (VR-96/503) of November 5, 1996, it expressly prohibits certain specific acts under article IX of the Act in relation to the exercise of space activity in Ukraine.

Such acts include the "placing, testing or testing of weapons of mass destruction, the aggressive or military use of environmental modification techniques, endangering human life, causing harm to the environment,

Violating international norms and standards relating to the pollution of outer space and other work related to space activity and it is not permitted by international law (Ukrainian National Law No. 503/96-VR, 1996).

As for Australian legislation, it has taken another course of action when it contains standard conditions for launch, which understand Australia's commitment to the text of Article 1 of the Moscow Partial Ban Treaty, 1963.

These conditions are set forth in the text of Part 29 in accordance with the provisions of the Space Activities Act (No. 123 of 21 December 1998). These requirements require that: "The object to be launched is not a nuclear weapon or contains any nuclear weapon or weapons of mass destruction, or any unauthorized fissile material"(Index: A/AC. 105/C. 2/L.224, 22. 2001, P.11)).

The law of the United Kingdom, which is subject to pollution and enters into the terms of licensing, the Outer Space Act 1986, which came into force on July 31, 198.

Section V states: "By requiring the licensee to obtain prior approval of any planned deviation from tropical factors, and to inform the Minister of State of any unintentional deviation. The concessionaire is to conduct operations to prevent the pollution of outer space or enter any negative changes on the Earth's environment or interference in space activities to others, also demanding the disposition of the cargo" (Index: A/AC. 105/C. 2/L.224, 22. 2001, P.12)).

What can be deduced from the above definitions is that, the environmental pollution of outer space is a condition resulting from changes in the outer space environment that damage the Earth's environment, its environment or other space activities, directly by disturbing its ecosystem, causing the contamination of outer space by microbes, gases, solids or radiation Nuclear and other pollutants.

The second topic: the concept of the use of military weapons of outer space and mechanisms for disarmament

Immediately before the concept of military use of outer space, the true meaning of the word peaceful use by the United Nations and its various institutions should be highlighted in its deliberations on many issues or the issuance of numerous resolutions. In 1958, it even called the Committee on Outer Space Affairs, the Committee on the Peaceful Uses of Outer Space (Omar Hosni, 1969, p.129).

The first requirement: the problem of the definition of the peaceful use of outer space

It is noteworthy that there is no agreement on what is meant by peaceful expression. International law and the Charter of the United Nations refer to the term peaceful, non-aggressive, it is a term based on non-recourse to war, non-threat or use of military force. Therefore, some scholars went to the introduction of this intent and was applied in outer space. This means that the launch of reconnaissance satellites for military or security purposes, missile tests and other military activities can all be considered peaceful actions, although they ultimately serve the objectives of preparing for war in peacetime.

Such acts are not considered to be acts of aggression, as long as they do not carry out military aggression against another State (Mohamed Aboutela, 1972, p.110-111). In other words, the peaceful use of this interpretation does not preclude the use of outer space for military purposes, and the prohibition is limited to space uses for aggressive purposes. However, the text of Article II of the statute of the International Atomic Energy Agency in 1959, which states: "The Agency strives to accelerate and increase the contribution of atomic energy in the service of world peace, health and prosperity. Its capacity shall ensure that the aid provided by it is not used, at its request, under its supervision or control, including for military purposes" (Statute of the International Atomic Energy Agency, 1959).

As well as the text of Article I of the Polar Convention in 1959 : "The Antarctic Zone shall not be used for non-peaceful purposes and shall prohibit any bombing of a military nature there, such as the establishment of military bases and fortifications, the conduct of military manoeuvres and the prohibition of testing any type of weapon therein." (Mohamed Aboutela, 1972, p. 412). The inconsistency in the interpretation of the word peaceful was because the Charter of the United Nations meant a non-aggressive meaning without resorting to the use of military force, whereas the aforementioned international collective agreements interpreted the word in a non-military sense.

Moreover, all the space treaties and United Nations resolutions on outer space did not go to the interpretation of the word peaceful, and was interpreted by the United States of America to mean non-aggression while interpreted by Russian jurists and officials in a non-military sense (Omar Hosni, 1969, p.157). It can be argued that any activity in outer space may involve hidden military objectives under the appearance of civilian objects; Earth's satellites can be used as a fast means of communication and can be used for meteorological observations. At the same time, they can be used for military espionage and reconnaissance, and spacecraft and space stations used for scientific research can be used as launchers for space weapons or for nuclear invasion.

The second requirement: the race in the arming of space (the militarization of space):

The developed countries began to develop their military programs that they started in the 1950 Ballistic projectiles were developed, Intercontinental ballistic missiles and nuclear warheads in both States. The United States has begun firing hundreds of nuclear bombs into orbit around the Earth, keeping them ready for nuclear strikes on the territory of the former Soviet Union (Wissam Coro Kaku, 1987, p.9). In return, the Soviets were able to develop their military programs. Partial orbiting satellites with nuclear warheads were launched in low-Earth orbits in 1967. "Anti-satellite satellites" were designed, and the most dangerous was the Hunter Keller satellite designed to capture, engage and destroy hostile satellites in orbit in 1978 (Khader Al-Dahrawi,1982, p.205).

As a result of rivalry between the Soviet and American space programs, further developments of space technology have been embarked upon by both countries, These developments have taken a new course in the use of nuclear power sources in (anti-satellite systems) and (space combat systems), thus exceeding its first mission in peaceful use as a source of energy for satellites. This is a dangerous shift in nuclear use in outer space. A missile project (Nike Zeus), a US software anti-satellite, the missile is operated in three stages and has an orbit at an altitude of 240 km. His warhead was nuclear with a potential charge and the radiation from the fireball after he detonated the charge close to the target. X-rays caused by a nuclear explosion generate electromagnetic pulses that hit or disrupt an entirely hostile target according to the protective measures contained in that moon (Amer Al-jumard, 1990, p.118).

The project of the "anti-satellite system" US, has developed the technology of the so-called "micro-corrected vehicles"(Amer Al-jumard, 1990, p.119). The technology that has been selected is to send a four-phase missile on a plane (V-15) distinct flexibility movements, and then up to outer space, the spacecraft is made up of a series of small missiles that surround eight infrared sensors. Upon the arrival of the vehicle to the target area, the vehicle will continue to pursue him, and closes on the satellite tentacles target using the heat emitted from it and encountered, and went to shock the satellite target large enough force to destroy it "(Wissam Coro Kaku, 1987, p.35).

Former President Ronald Reagan had a strong desire for the militarization of outer space with advanced technology. He initiated the Strategic Defense Initiative in 1983. They are defensive systems that address intercontinental logistic ballistic missiles carrying nuclear warheads to prevent them from reaching their targets by destroying them at different stages of their path. This program is based on the use of lasers and a high level of technology, and uses the so-called "death rays" in the face of satellites and these rays are destructive light beams with very high energy, throwing forces of the atom and laser.

One of the most advanced pieces of equipment of this nuclear-based combat system in outer space is the space-based "electromagnetic cannon system". There is an infrared chemical laser system, including an X-ray laser that uses a nuclear bomb as an energy source. When the bomb goes off, its energy is concentrated on metal rods that are vaporized by X-rays and then released. The X-ray laser is a single-shot weapon, and by nuclear break-up it can disrupt nearby satellites and weapon platforms. This type of weapon is called "guided destruction energy" (Amer Al-jumard, 1990, p. 118-119).

The satellite can also plant small, cheap and many "space mines" that fly near hostile orbital stations and detonate them when ordered to do so (Khader Al-Dahrawi, 1982, p.234). It is worth mentioning that the United States and the Russian Federation are still launching satellites intended for military purposes to Earth's orbits, despite the disparity between the potential of the two countries because of the collapse of the Soviet Union. However, military plans and competition in armaments continue because of technological advances in space technology applications.

In the United States' plans for space flight (1999-2008). America launched (305) satellites intended for purely military purposes, at a cost of 35.1 million dollars (Daniel. D, 1984, p 16-28). As for Russia, it launches 15 military satellites annually, with an annual launch rate of (10-11) satellites intended for military purposes launched by the United States, China and Europe. Therefore, it can be stated that both countries (the former Soviet Union, the United States of America) did not abide by the principles of international law and the legal rules contained in the Outer Space Treaty of 1976, and the Moscow Convention of 1963 (H. Peter Van, 1980, p.36).

The third requirement: environmental effects Experiments of nuclear explosions on outer space

Experiments with nuclear explosions in outer space are among the most dangerous pollutants in the outer space environment. In addition, its effects reach the Earth's atmosphere, where the danger of nuclear explosions is that they generate enormous nuclear energy: either Fusion or Fission. The explosion results in the release of nuclear fragments very quickly and temperatures reach 100 million degrees Celsius, accompanied by a huge amount of nuclear radiation (alpha rays, minor injuries, beta rays, enter the body through the openings and cause fatal injuries. Gamma rays are very dangerous, causing radioactivity of the materials they encounter, causing spinal cord destruction, leukemia, fission and death within eight weeks (Mahmoud Bannouna, 1971, p.70).

It should be said that nuclear explosions carried out in outer space by nuclear states cause the contamination of outer space with nuclear radiation and the resulting nuclear secretions (nuclear fragments, radiation, free neutrons and atomic dust) remain floating in outer space in a particular area. This leads to great danger to the orbits of the Earth's surrounding or surrounding space or the Earth's environment and the disruption of space activity and navigation. One of the harmful experiments in outer space is that of the United States of America, which has caused a sensation among the legal and scientific community alike, the first or second Western Ford project or project. These experiments are summarized by the deployment of copper needles in outer space by satellites, to make two belt around the globe, and the first belt was formed in 1961 to deploy 350 million copper dusts weighing 33 kg. Each diameter of the needle equivalent to one-third of human hair, at an altitude of 3200.

The second project, or the second belt, was in 1963, was formed to release 400 million copper needles at an altitude of between 4800-6400km. The purpose of the deployment of these copper needles is to make regular belts, which help to intercept with missiles launched to other countries, and jamming their contacts Wireless and these needles have formed a barrier to the next broadcast of the universe (Riyad Al-sandi, 1980, p.70). International jurists have stressed that these tests pose a grave danger to the future of space navigation, have harmful effects on the space activities of States and impede communications with space ships in their orbits and with satellites launched into outer space.

In addition, the Russian Space Communications Organization said:

"The US military is arranged with the help of this belt to create a space communications system aimed at commanding military missiles and air power in the event of war, and scientifically, building a casing of millions of needles in outer space. To block communications with spacecraft launched to the Moon or to other planets of the solar system " (Noaman El-haiti1986, p.53-55). Bernard Lovell, director of Biggest Radio telescope, objected to the test, saying such experiments would contaminate outer space.

In 1961, the International Astronomical Union (IAU) issued a resolution in this regard, affirming that it is necessary to inform international scientific bodies of conducting such experiments before conducting them. Subsequently, Resolution No. 1962 of 1963 of the United Nations General Assembly on the Legal Principles Governing the Activities of States in Outer Space was introduced in Principle VI. Article IX of the Outer Space Treaty, in order to regulate this issue, expressly states the obligation of States to take into account the mutual interests of all other States Parties to the Treaty and to avoid any harmful pollution to outer space.

International consultations should also be conducted at the request of one State if it has reason to believe that another State Party to the Treaty is conducting an experiment or activity in outer space that may constitute a harmful interference or obstruction of the space activities of other States (Report of Committee, No.20 (A/56/20, 2001, p.23). Radiologist James Van Allen told a scientific journal that US atomic experiments that lasted until 1962 had created a new radiation belt in the lower layers of Van Allen's belts, adding that the belt could be a temporary radioactive zone. It could stay in space around the Earth for a period of five years at a height of between 25-1000 miles. This new radiation belt could disrupt future space flights and indeed this belt has delayed the US Mir Curie space project, and led to the modification of the radiation position of the nature Ground, as well as bad effects on communication Wireless LAN (Outer Space Treaty, 1967).

It should be said that the text of Article IX is explicit when it obliges States not to undertake any activity or experiment that causes "any adverse changes in the Earth's ocean", when studying and exploring outer space and prohibits nuclear explosions, even for scientific or other peaceful purposes. As long as radioactivity falls within the same gravity, based on the text of Article IV of the Outer Space Treaty and the text of Article 1 of the 1963 Moscow Treaty.

Fourth requirement: international efforts for the disarmament of outer space

- United Nations Commission issued its decision No. 1884 in November 1963, 17, all States called for a commitment to "refrain from establishing any nuclear weapons or any kind of weapons of mass destruction, in orbit around the Earth, or in any celestial bodies or in outer space.
- The Moscow Agreement of 5 August 1963 declared a prohibition of partial arming in outer space, air and under water between the United States of America, the former Soviet Union and the United Kingdom, to prohibit nuclear testing in outer space.
- There is no doubt that the world public opinion was the first motive for the conclusion of this treaty, after the development of deadly weapons reached a level that cannot be tolerated in light of the nuclear rivalry between the Eastern and Western blocs during the Cold War. In addition, it was in the interest of the two camps at the time to take even a secondary step towards a response to World public opinion which was against the dangers of nuclear weapons testing (Amer Abed-elfatah, 1990, p. 124-125).
- The treaty contains five articles. It has two main objectives: The first is to "put an end to the pollution of the human environment by radioactive materials from nuclear tests that have caused a great international uproar"(Mohamed Sami, 1988, p. 209). The second objective is the speedy work of the agreement on comprehensive and complete disarmament under effective international control within the framework of the United

Nations in accordance with its objectives, an end to the arms race and a halt to the production and testing of all types of nuclear weapons in outer space.

- Article I of the Treaty, the most important of its articles, contains the obligation of States parties not to carry out any test of a nuclear weapon or any other nuclear explosion in outer space, even for peaceful motives, and obliges all States parties: “To encourage, assist or participate in any way in any nuclear explosion of any kind to another State if it causes radioactivity in outer space” (Iman Azzawi, 1986, p. 22-21).
- As a result, this treaty has contributed to the development of a legal text prohibiting the development of ballistic missiles with nuclear weapons or any other lethal weapons in orbit as a legal rule rather than a declaration principle and has increased the importance of this Convention when signed, ratified or acceded to 113 States (Alawi Amjed, 1979, p. 206-208).

Conclusion:

The need for international attention to develop a legal regulation addressing issues related to changes in the Earth's environment or pollution of the outer space environment has become an urgent necessity that will determine State responsibility for the damage caused by their prohibited experiments in the outer space environment. Pollution of the outer space environment must be dealt with in an international agreement organized within the framework of the international organization because its risks are too high to be regulated in a treaty, by a treaty (the 1972 Liability Convention). Based on the above, the international community should agree on mandatory solutions to curb such space experiments and research by enacting strict legal rules against pollution damage.

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