

Space Debris: Legal Status and Liability Regime

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Due to the fact that the active world exploration of outer space has both positive and negative consequences, the search for effective mechanisms to overcome the negative human impact from the implementation of space activities is now relevant, in particular, the destruction of a huge amount of space debris is important. This study aims to find an answer to the question: how is the legal status of space debris determined at the international level, as well as what is the legal status of the Inter-Agency Space Debris Coordination Committee? The search for an answer to this question is implemented by analyzing scientific opinions, international documents, norms of national legislation of Ukraine and certain US legislative provisions. The basis for its implementation was the use of such methods of scientific activity as thematic and content analysis, collation and comparison, with the help of which the author's definition of the legal status of "space debris" was provided and its features were highlighted. The analysis of existing international legal acts showed the absence of international norms and mechanisms that would fully protect against damage that can be caused to life, property or the environment from space debris, because the adopted norms and developed mechanisms are optional for implementation and are designed for the "good will" of participants in space activities. An effective solution to this global problem is possible only through international cooperation. However, the available scientific data and the current state of technology do not allow us to expect that a broad international agreement can be adopted in the near future that would comprehensively and effectively regulate aspects of space debris management.

Keywords: space activities, space debris, outer space, Inter-Agency Space Debris Coordination Committee, legal status, legal liability.

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Introduction

The active development of the space industry and scientific potential is a direct factor in the dynamics of international relations. The constant transformation of their social and non-social environment of their existence results in both a general improvement in globalization and integration processes, as well as an aggravation of geoeopolitics problems.

It is noteworthy that modern international space law does not sufficiently regulate the relations that arise between subjects of space activities regarding the pollution of outer space and responsibility for such actions. In addition, current trends in space activities, such as its commercialization, an increase in the number of participants in space activities also at the expense of non-state actors, leads to an increase in the number of space objects in low-Earth orbit, which are potential space debris.

Back in 1999, paragraph 366 of the report of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space stated that new technical issues related to space debris, the use of nuclear energy sources in outer space and other issues arose due to the intensification of space activities. And these questions over time have not ceased to cause concern in the world community, but on the contrary, even more new questions arise, for example, whether to deal with space debris in space, or to return it to Earth to Point Nemo, which many scientists call "space cemetery" for the number of spaceships (which is at least 260) laid in a water grave.

According to recent studies, an average of 100 to 200 tons of space debris return uncontrollably to Earth's atmosphere each year, but the vast majority remain above us, where they can collide with functioning satellites, create more debris, and endanger the lives of people

on crewed spacecraft. According to a report released by NASA in 2021, “there are at least 26,000 pieces of space debris around the Earth the size of a ball or more that can destroy a satellite in the event of an impact; more than 500,000 the size of a ball large enough to cause damage to spacecraft or satellites; and more than 100 million pieces the size of a grain of salt that can penetrate a spacesuit.”

Thus, active global space exploration has both positive and negative consequences. Therefore, it is necessary to make a lot of efforts to overcome the negative human impact from the implementation of space activities, in particular, it is important to destroy a huge amount of space debris.

This task is now one of the most difficult, because there are a large number of legal issues that require creative solutions within the framework of international cooperation, so that International Space Law can keep up with the rapid development of space mechanisms and technologies (ACONF184_6E, 1999).

Theoretical approaches to defining the category “legal status”

The “status” category is widely applicable in various interpretations. Its interpretation is as follows: 1) position or rank in relation to others; 2) relative rank in a hierarchy of prestige; 3) the condition of a person or thing in the eyes of the law; 4) state or condition with respect to circumstances (Status, 2022). Some scientists believe that this word defines the quantitative and qualitative characteristics of a phenomenon or object (Komarova, 2018: 58), while others add that synonymous words for this word are “position,” “state,” “modality” or “indigenate” (for a foreign person) (Tereshchuk, 2020).

As defined in Black’s Law Dictionary, 1447 (8th ed. 2004), the word “status,” refers to “the sum total of a person’s legal rights, duties, liabilities, and other legal relations, or any particular group of them separately considered” (Connolly & Black, 2004).

In *May v. Daniels*, 359 Ark. 100, 108 (Ark. 2004) the Arkansas Supreme Court notes that the fact that a term can have more than one possible meaning does not make it meaningless if its meaning can be correctly derived from the context in which it is used (Supreme, 2004).

Therefore, in official legal documents, you can often find the application of this category to determine a certain state, including the legal one. However, in most cases, the category “legal status” is used to indicate the state of a person in the circle of legal relations. It is based on the actual social status, the real state of a person in this system of social relations (Vytruk , 1993: 152) in relation to both form and content (Makarchuk, 2015: 18).

That is, as a general rule, legal status is a component of the general problem of individual rights. Proper and comprehensive regulation of which allows citizens to exercise their rights and protect their legitimate interests (Avtorgov, 2008: 10). As an example, the term “legal status” is commonly used in Arkansas law to classify an individual and identify the legal rights and duties for such a classification, like the legal status of an invitee or a stepparent (Supreme, 2004). In the legislation of Ukraine, this term characterizes the belonging of a person to a certain category (for example, the legal status of a war veteran (On the status, 1992)) or the state of legality of a certain action (for example, the entry into legal force of electronic data (On electronic, 2003)).

This term is also used to disclose the place and role of specific legal entities of public law in a certain mechanism for regulating public relations. Unlike individuals, legal entities are not living beings and therefore do not have a natural will, but they have a united human will

and a united human force in a certain direction determined by the purpose of creating a legal entity. As a result, a legal entity is recognized as a subject of law. It should be noted that a legal entity is an independent subject of legal relations and exists independently of the individuals who formed it, and although this collective entity is recognized as a subject of legal relations, however, as a legal entity, it can only bear such rights and obligations that are not related to the natural properties of people (The procedure, 2015).

Accordingly, we can determine that the category “legal status”:

1. In the context of individuals, it outlines their legally established rights and obligations.
2. In the context of legal entities of Public Law characterizes their role and purpose in the mechanism of implementation of state functions as a representation of normative, information-analytical, implementation, optimization, expert, conciliatory, organizational, control-supervisory, administrative and other active administrative actions. That is, each such subject, acting on behalf of and at the request of the state, is a bearer of legal powers, performs a specific task and has its own functions, the proper implementation of which is confirmed by their duty to be a bearer of legal responsibility.
3. In relation not to subjects of law, but to things, objects and phenomena – represents their state in the norms of the law, that is, determines their legal characteristics and affiliation.

Separately, it should be noted that the category “legal status” may be applicable to special subjects of law – international organizations. They are secondary subjects, because they are created by the common will of states, and have a legal personality derived from them.

Glossary of Statistical Terms gives such definition: “International organisations are entities established by formal political agreements between their members that have the status of international treaties; their existence is recognised by law in their member countries; they are not treated as resident institutional units of the countries in which they are located” (International, 2022). Such an organization may enter into international legal relations only within the limits of its competence defined in its constituent document – the charter (treaty, agreement) (Tymchenko & Kononenko, 2012).

The legal status of space debris

The basic document for the regulation of space relations is the Treaty on the principles of states’ activities in the exploration and use of outer space, including the Moon and other celestial bodies. In addition to the fact that this document contains fundamental provisions for regulating space activities, article I also establishes: “...the exploration and use of outer space is for the benefit and interests of all states, and outer space is the property of all mankind.” Thus, these principles provide for the protection of outer space from pollution. In turn, article III of this treaty also provides that the implementation of space activities must take place in accordance with the norms of international law, including the Charter of the United Nations (UN). It states that international disputes must be resolved by peaceful means and in a way that does not endanger international peace and security, and therefore does not harm the environment.

Ensuring the protection of the environment from space debris, accordingly, provides for the establishment of its international legal regime, which includes establishing the ownership and responsibility of the owners of such objects.

Indirectly, liability for damage caused by space debris is defined in article VIII of the Treaty on the principles of states' activities in the exploration and use of outer space, which states that each state party to the Treaty that carries out or organizes the launch of an object into outer space, as well as each state party from the territory or installations of which the object is launched, bears international responsibility for damage caused by such objects or their components on Earth, in air or outer space. That is, space debris is not explicitly stated, but a space object after the end of its service life or its fragments (components) after an attempt to dispose them can be considered such debris. Consequently, it is quite possible to bring to justice for damage caused by such objects in accordance with the norms of the specified Treaty. After all, according to paragraph b of article I of the Convention on registration of objects launched into outer space, "a space object includes the components of a space object, as well as the means of its delivery and its parts" (Convention, 1975). And article VI stipulates that in cases where a state party to this Convention cannot identify a space object that has caused damage to its natural or legal persons or is potentially dangerous, all other states parties shall assist in its identification (Convention, 1975). However, it is quite difficult to establish a causal relationship between the damage to an object and space debris. Identifying a specific piece of space debris and attributing its appearance to a particular launched object is often problematic. Even more difficult is the task of establishing the "fault" of the state that launches the space object.

The Convention on international liability for damage caused by space objects plays a leading role in determining the international legal status of space debris. In accordance with its article III, if in any place other than the surface of the Earth, a space object of one launching state or persons or property on board is damaged by a space object of another launching state, the latter is liable if the damage is caused by its fault (Convention, 1972). That is, this rule establishes full liability for damage caused by "space debris," if its guilt is proved. The disadvantage of this norm is that it is designed for the "Good Will" of the culprit. For example, in 1978, the wreckage of the Soviet Kosmos-594 satellite fell on Canada (Hein, 2015). The claim on the basis of the USSR Liability Convention was not filed, but was settled during bilateral negotiations. The USSR did not recognize its responsibility, referring to the definition of damage in the convention on liability (The principles concerning the use of nuclear energy sources in outer space were not yet adopted). At the same time, the USSR compensated Canada 50% of the costs for operations carried out to search for and remove radioactive elements as a good will (Stelmakh, 2016: 184). The most famous case of space debris falling on a person occurred in Oklahoma: a piece of space debris weighing as an empty jar hit a woman named Lottie Williams. The fragment was similar to a cloth, but made of metal fibers. The woman was sure that she caught a piece of the shooting star, but the investigation showed that it was most likely part of the Delta-2 launch vehicle (Hein, 2015).

The challenge to develop the first set of international guidelines for minimizing the formation of space debris was adopted at the 17th meeting of the Inter-Agency Space Debris Coordination Committee (IADC) in Darmstadt (Germany) back in 1999. It is worth noting that under these Guidelines, some regions in outer space are granted the special status of "protected regions" (low Earth orbit, 2000 km from the Earth's surface, and geosynchronous region). Passivation (energy release, removal of all forms of stored energy, including high-

pressure fuel and liquid residues, and battery discharge), deorbitation (removal of a spacecraft or orbital stage from orbit into the Earth's atmosphere in order to prevent the threat that a certain space object poses to other similar objects) and reorbitation (purposeful change of the spacecraft's orbit or orbital stage) are considered as measures that can help minimize space debris. It is recommended that a balanced Plan for space debris minimization be developed for each program or project (Stelmakh, 2016: 79).

Note that these principles were adopted by consensus within the IADC. While voluntary, the Guidelines encourage space actors to use them as the standard which they will apply when setting design requirements for spacecraft and Orbital stages, and operators of already functioning spacecraft and orbital stages will be guided by them to the greatest extent possible.

Thus, the existing international legal framework on liability for damage caused by space debris is designed for the "good will" of the signatory countries to the Convention on international liability for damage caused by space objects. And there are no mechanisms for bringing to justice for the formation of space debris. Even when the actions of the participant in space activities were deliberate. Like, for example, the actions of China, which in 2007 shot down its own satellite during tests of an anti-satellite rocket, leaving more than 3,000 small fragments in orbit (Weeden, 2010).

It should be noted that along with the term "space debris," scientists and practitioners use the term "orbital debris" as a synonym for it. Therefore, without going into the discussion about the appropriateness or inappropriateness of using these terms, we will use these two phrases as equivalent in our research. As for the definition of space debris, we take as a basis what was provided in the IADC Space Debris Mitigation Guidelines "Space debris are all man made objects including fragments and elements thereof, in Earth orbit or re-entering the atmosphere, that are non functional" (IADC, 2020).

A similar definition is given in the aforementioned NASA report, which states that "orbital debris" is man-made objects in space that no longer serve useful purposes, such as decommissioned satellites and spacecraft parts, lingers over the Earth's atmosphere for years until it disintegrates, leaves orbit, explodes, or collides with another object (NASA'S, 2021: 3).

Thus, the legal status of space debris as a space object is characterized by a set of individual properties (features) defined by legal documents, which activates the legal mechanism to counteract its formation and subsequent disposal.

In order for a space object to acquire the legal status of "space debris," it must meet the following criteria, which are defined in international documents:

1. To be artificial, that is, created by man, both in its original form and in its remains (fragments, parts, etc.).
2. Be in a non-working condition (not functioning) or decommissioned.
3. Lose their useful targets while orbiting the Earth or entering its atmosphere.

So, the analysis of the current international regulatory legal acts allows us to state the existing great danger that occurs both in outer space and on the Earth's surface from existing and future space debris. And about the lack of international norms and mechanisms that would fully protect against damage that can be caused to life, property, or the environment from such debris. And the norms adopted and the mechanisms developed are non-binding and are designed for the "good will" of participants in space activities.

In our opinion, the way of a possible solution to this problem is to develop an international treaty that should consolidate the legal regime of outer space, regulations on the implementation

of regulation of activities for cleaning the orbit, establish standards for preventing the formation of space debris, areas of responsibility of mission control centers in the field of space debris control, and so on. An important point is also to inform the public about the threat to the ecology of the planet and its inhabitants from space debris and solve the problem of its elimination.

Legal Status of Inter-Agency Space Debris Coordination Committee

The problem of space debris has several dimensions: scientific, technical, legal, environmental, and so on. This topic attracts the attention of many national research centers, space agencies and, with varying degrees of coverage, is periodically discussed at numerous committees and commissions of international organizations, such as the International Astronautics Federation (IAF), the Committee for Space Research of the International Council of Scientific Unions (COSPAR), the International Telecommunications Union (ITU), the International Institute of space law (ICJ), etc. Recently, this activity has been carried out within the framework of the Scientific-technical Subcommittee of the United Nations Committee on the Peaceful Uses of outer space (STCS UN COPUOS). However, currently, the IADC is the most relevant structure to the problem of space debris, which is designed to coordinate the activities of states related to the contamination of outer space with objects of anthropogenic and natural origin.

The legal status of the IADC consists of delegated powers granted by its participants to determine, plan and assist in the implementation of joint activities that are of mutual interest and benefit (Terms, 2022). Members of the IADC have the right to vote and are space agencies, authorized governmental or intergovernmental organizations that carry out space activities through the production, launch and operation of spacecraft or the production and launch of rockets. International consortia sponsoring major satellite programs or relevant specialized UN agencies may be invited to IADC meetings.

In addition to members with the right to vote, participants in the status of observers may participate in IADC meetings. This status has no member privileges and has a time limit of no more than two years.

According to the Terms of Reference of the Inter-Agency Space Debris Coordination Committee consists of a Steering Group (SC) and four specified Working Groups covering measurements (WG1), environment and database (WG2), protection (WG3) and mitigation (WG4) (Welcome, 2022).

The SC consists of delegations from each member country, no more than three people, and each group consists of 2-3 experts from each member. The SC is headed by the Chairperson, who convenes its meeting and draws up the agenda. The Chairperson shall be elected for two meetings together with the vice-chairperson, who will be next in office at the end of the Chairperson's term. The Chairperson is assisted by the Secretariat, whose primary role is to maintain the list of activities, the list of documentation and the IADC reference set. The Secretariat consists of one representative from an IADC member who works on a voluntary basis and is appointed for a three-year term. All SC decisions are drawn up in a protocol and made by consensus.

SC's scope of activity is the overall management and management of the IADC, which includes (Terms, 2022):

1. Organization of general IADC activities;
2. Global coordination of working groups;
3. Identification of new areas of activity;
4. IADC representation in other organizations;
5. Setting the date and venue of all IADC meetings and steering group meetings;
6. Appointment of a Chairperson and a deputy in each working group;
7. Monitoring the activities of working groups;
8. Setting tasks and distributing them to working groups;
9. Identification of tasks that are solved;
10. Coordinate and respond to requests from other organizations on issues related to space debris;
11. Contribute to the education of the aerospace community and the general public on space debris issues.

So, the category «legal status» in the context of the Interagency Coordination Committee on space debris: 1) is characterized by a set of certain legal elements that determine its legal personality, give it the ability to resolve issues delegated to it from the primary subjects of Law; 2) determines its role and purpose in the mechanism for preventing the formation of space debris.

Conclusions

Now it is voluntary measures (legal instruments of a recommendatory nature) that prevail in the field of space debris management and are based primarily on the consciousness and responsibility of participants in space activities. The available scientific evidence and the current state of technology do not allow us to expect that a broad international agreement can be adopted in the near future that would comprehensively and effectively regulate aspects of space debris management. But even now, states could prepare an international document banning deliberate explosions in space, which are the main source of space debris formation, as well as creating an international system for monitoring and controlling space debris. An effective solution to this global problem, which affects the interests of all states, is possible only through international cooperation. At the same time, the adoption of relevant national laws would also contribute significantly to resolving the issue.

However, despite the fact that the phenomenon of legal status contributes to the legal certainty of legal relations and social processes, it should also be stated that today there are no agreed positions among scientists on what should be understood by the concept of “legal status” (paradoxically, the concept of “legal certainty” still does not have a universal definition). This problem is typical for modern jurisprudence, since it is inherent not only in the concept of “legal status,” but also in all categories used in this science, and also have a fairly wide distribution in everyday life and in other sciences. Therefore, the solution of this problem is possible only by clarifying the essential content of the concept of “status,” as well as understanding it in legal science by critical analysis of existing approaches to the definition of the concept of “legal status,” comparing it with the category of “legal regime,” “legal status,” “legal mode,” etc., which we will implement in further scientific research and investigation.

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