

UDC 349.6

doi: 10.15330/jpnu.5.1.107-114

## PROTECTION OF SPACE ENVIRONMENT IN THE LIGHT OF PERSPECTIVE CHALLENGES OF “SPACE WARS”

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**Abstract.** In article it is analyzed action in the space of the principle of prohibition of the use of force and threats (*jus contra bellum*). Also it is researched application of Geneva Law to space conflicts (*jus in bello*) and its correlations with another hard and soft norms of international law in the light of protection of space environment such as Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, Declaration of the United Nations Conference on the Human Environment 1972, Rio Declaration on Environment and Development 1992 etc. Beside this it is used practice of International Court of Justice for argumentation of positions and conclusions. Since space objects management is done remotely with help of software, author draw parallels between legal regulation of international conflicts in outer space and cyber space. Furthermore, it is researched specific features of application the principle of proportionality in international space armed conflicts with the aim of protection environment of space and Earth.

**Keywords:** space, war, prohibition use of force and threats, *jus contra bellum*, *jus in bello*, proportionality, humanitarian law, MILAMOS, protection of environment, armed conflict, space debris.

### 1. INTRODUCTION

Space is becoming an increasingly valuable natural environment, which is perceived by space entities as resource. World history shows intensity of the attack on the resource is directly proportional to its values and erosion of its legal status. At present it is obvious strengthening of military and political tension between leading space-faring nations. It is reflected in provisions of resolution draft “Space as a driver of sustainable development”, which is prepared for fiftieth anniversary of the first United Nations Conference on the Exploration and Peaceful Uses of Outer Space, namely “All Member States, in particular those with major space capabilities, should contribute actively to the prevention of an arms race in outer space, with a view to promoting and strengthening international cooperation in the exploration and use of outer space for peaceful purpose” [11].

Unfortunately practice shows reverse trends, which is accompanied by active growth of military potential to “space wars” [7]. Whereas actual relations generate legal norms, it is not strange that sources of legal regulation of “space wars” are preparing very rapidly. Most important of such drafts is Manual on International Law Applicable to Military Uses of Outer Space (MILAMOS), which is

currently being developed by the University of Adelaide, McGill University and University of Exeter. Its developers are convinced that principle of peaceful usage of space by all states, which is fixed in The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (OST) [23], “peaceful” is to be equated with non-aggressive, but it does not otherwise prohibit militarization of space. That is why space, similar to ground, water and air, is an environment for international military conflicts [21; p. 2].

Given this, it is necessary to analyze the principle of prohibition of the use of force and threats application in space (*jus contra bellum*). Also it is expedient to research application of Geneva and Hague Law during space conflicts (*jus in bello*) and its correlations with other hard and soft norms of international law in the light of protection of environment. Since space objects management is done remotely with help of software, parallels should be made between legal regulation of international conflicts in outer space and cyber space. The last one is encouraged by Manual on the International Law Applicable to Cyber Warfare (Tallinn Manual), prepared by NATO in 2017. Author considers as expedient to research such legal sources in light of protection of outer space as natural environment and environment of Earth from the outcomes of armed conflicts with applying of space technologies.

## 2. ANALYSIS AND DISCUSSION

### *Jus contra bellum*

The boundary between legal regimes *jus contra bellum* and *jus in bello* is compliance with or violation of principle of prohibition of use force and threats, which is one of the major principle for ensuring of peaceful coexistence of international community (p. 4, art. 2 of UN Charter) [25]. Clear prohibition left place for numerous of questions in international law doctrine, which are aggravated against of background of special regime of outer space and space activity. Let’s pay attention the most significant of it.

#### Features of actors

Prohibition of use of force and threats is enforced in international relationships, namely between states and it is not applied to private entities. However, world tendencies of exploration and use of outer space show increasing of amount of private actors of space activity, which is encouraged by states by the means of public-private partnership<sup>1</sup>. Also they develop and protect of their interests with help of powerful multifunctional unions<sup>2</sup>. It is necessary to made clear teleological division between state entities with military purpose and private entities with commercial aims. But it does not exclude private actors from participation in space armed conflicts. Nowadays, private entities are the owners of powerful security systems for “space wars”, which provide early detection of preparation to and start of attack, communication and retransmission of information and supervision. On the other hand, according to Article 8 OST, State Party on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such objects. So, it is possible to change purpose of space objects from commercial into military under the influence of administrative resource of the state. In such circumstances there is not clear if prohibition of the use of force extend to the operators of space objects in view of their non-state nature.

However, decisions of International Court of Justice in cases of “Nicaragua v USA” [3] and “Congo v Uganda”[2] points out that the use of force by non-state bodies is a violation of the relevant prohibition only if state take significant part in such use of force. In this context Article 6 of OST about responsibility of states for its national space activity in connection [23] with above mentioned Article 8 of OST allow asserts that prohibition of use force and threats is applied to all space activity participants (public and private) because they are on the jurisdiction and control of the state, which bear

<sup>1</sup> For example, public-private commercial push by NASA has been underway since the establishment of the Commercial Orbital Transportation Services (COTS) program in 2006.

<sup>2</sup> The Space Data Association (SDA) is an organization that brings together satellite operators who value controlled, reliable and efficient data-sharing critical to the safety and integrity of the space environment and the RF spectrum. The SDA membership includes the world’s major satellite communications companies.

responsibility for their space activity. Given this, regime of international armed conflicts can only appear in outer space. At the same time, non-international armed conflicts can start only if there is attack on and control of ground-based segment of space activity.

#### **Content of principle of prohibition of use force and threats**

Prohibition of use force and threats is very discursive in international law because it is related to divisions according to degrees of the intensity, the target orientations, the purposes and other circumstances. Part 5 Article 2 of UN Charter defines three objects, using force to which is prohibited. There are territorial integrity, political independence and the aims of UN (according to Article 1 of UN Charter, they are: maintenance of peace and security, friendly relations between nations and international cooperation) [25]. Most serious and dangerous form of unlawful use of force is aggression. According to United Nations General Assembly (UNGA) resolution 3314 (XXIX) of 14.12.1974 aggression is attack on the sovereignty, territory or use of it for an attack, as well as an attack on land, sea or air forces [8]. Also according to Article 49 of Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, attacks means acts of violence against the adversary, whether in offence or in defence on the ground, air and sea [18]. Norms of such international acts show that act of violence in the outer space is not considered as attack and attack on the space forces is not considered as aggression. It can be explained of lack technical possibilities to conduct comprehensive armed conflicts in space, which exist during the adoption of such international acts. As follows, key provisions of international law that limited action of principle of prohibition of use force and threats by means of objective and functional criterions, can be applied to space armed conflicts only conditionally, since none of the objects of force, except the aims of the United Nations, is not valid for the prevention of the use of force in space.

Jurisdiction of state of registry spread on space objects, it is not mean that such objects are the sovereign territory of such states. On this base, external influence on the space object should not be considered as a territorial intervention, and hence the use of force in the context of Part 2 of Article 4 of the UN Charter [25]. Such conclusion is based on division of contents sovereignty and jurisdiction, which exist in international law doctrine. Ian Brownlie defines their correlation as a whole and a part, that is, sovereignty provides a normal volume of state power, a typical manifestation of legal competence, and jurisdiction is turned out through the specific rights of the state or their limited volume [1; p. 106].

Complex analysis norms of UN Charter and UNGA resolution 3314 (XXIX) of 14.12.1974 show that force and threats of it are expressed in usage of armed forces only. Article 4 of OST obliges states to undertake not to place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner [23]. At the same time, security and percussive segments of armament are permissive under the international law [15]. Also it is noticeable that space debris belongs to percussive segments if it was launched into orbit deliberately. However, use of armed forces for decommissioning of space objects is not limited to direct impact on them in outer space. Ground-based segment is the most important for manage of space objects by means of telematics. So, it is necessary to distinguish one more non-kinetic kind of weapon, which is not prohibited by OST. But cyber-attack should be qualified as use of force when space objects are operated by telematics.

It is necessary to analyze of lawful grounds of use of force. There are self-defence, the consent of the affected State and the decision of the UN Security Council [14; p. 829]. First and last grounds are fixed in Articles 51, 39, 41 and 42 UN Charter as the common mechanism for responding to an armed attack [25]. However, the attempt to implement the right of self-defence into the norms of international space law has become only a subject of discussion that slowed the adoption of the International Code of Conduct in Space [10]. So, such ground is not recognized by international community. In this context it is needed to mention that Guidelines for the long-term sustainability of outer space activities fixed that defence or national security implications, should be fully compatible with preserving outer space for peaceful exploration and use [12]. Also such Guidelines define giving consent of the state on the external influence on the space objects under her jurisdiction and control as legal mechanism of

providing of active space debris removal. Thus, this ground is most perspective for legitimating the usage of force in outer space. An above-mentioned show, use of armed force in outer space is not prohibited according to nature of the action and the objects for which this action is directed by current international law. However, experts convinced that customary law rules governing the conduct of hostilities are applicable in all domains of warfare, i.e., land, air, sea as well as outer-space [22]. In our opinion, reason of this is consequences, namely damage to civilian populations and civilian objects, among which a special place must be occupied by the environment that creates the conditions for their preservation.

### *Jus in bello*

Usage of force in space is due to its natural features. Any, even targeted destruction of space objects will inevitably lead to littering of near-Earth space by myriads of space debris. It may stay in space different intervals of times, depending on orbit of its location, but all this time are equally longer in comparison with human life. Such situation will interfere with functioning of any space object that will be located in the corresponding orbits, regardless of their participation in armed conflicts. Furthermore, fall of such objects will threaten life and health of people on the Earth. The same effect will cause contamination of near-Earth space with nuclear energy sources due to such destruction. All of this, except for direct harm to objects of legal protection of the environment, will cause deactivation of weather monitoring and emergency management systems of a nature like United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER). So, preserving of neutrality during “space wars” seems unlikely. In this context it is necessary to parallel with international conflicts within the cybernetic space, where the high level of electronic interconnection between civilian and military objects causes a situation where an attack on any node of the system is an attack on the system as a whole [19; p. 200-201]. However, unlike consequences of cyber-attack, which can stay in cyber space, armed conflicts in outer space and with usage of ground-based and space-based technologies directly or indirectly will harm the natural environment of near-Earth space and Earth as well as sustainable development of mankind as a whole [19]. On this reason it is expedient pay special attention to means of protection environment during preparing of rules of international armed conflicts with the use of space and space technologies.

The “soft” norms on international environmental law, which can apply during armed conflicts, are: principle 26 of Declaration of the United Nations Conference on the Human Environment 1972, which proclaims that man and his environment must be spared the effects of nuclear weapons and all other means of mass destruction [6]; Article 20 of World Charter for Nature 1982, which stands that military activities damaging to nature shall be avoided [27] and principle 24 of Rio Declaration on Environment and Development 1992, which determines that warfare is inherently destructive of sustainable development, because states shall therefore respect international law providing protection for the environment in times of armed conflict and co-operate in its further development, as necessary [24].

The norm of international space law, which limits the destructive impact on the environment during space activities, is Article 9 of OST, which obliges States Parties to the Treaty shall pursue studies of outer space, including the Moon and other celestial bodies, and conduct exploration of them so as to avoid their harmful contamination and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter and, where necessary, shall adopt appropriate measures for this purpose [23]. Furthermore, Article 1 of Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (ENMOD) constitutes: “State Party to this Convention undertakes not to engage in military or any other hostile use of environmental modification techniques having widespread, long-lasting or severe effects as the means of destruction, damage or injury to any other State Party. Also they are not to assist encourage or induce any State, group of States or international organization to engage in such activities”. Article II of this Convention clarify that environmental modification must be deliberated and spread on outer space [5].

Beside this, rules of international armed conflicts, enshrined in Protocol I, oblige to protect the objects necessary for the survival of the population (Article 54), the environment from wide, long-term and serious harm (Article 55), as well as to prevent attacks on installations and structures, containing

dangerous forces (Article 56), notwithstanding the fact that in the doctrine of international law, large-scale ambient air pollution is not recognized as a violation of the prohibition of the use of force [18].

The participants in the process of preparing MILAMOS rightly point out that such wide range of sources international law need to conduct reconciling of legal regimes. Mechanisms of such reconciling were developed by International Law Commission in the Draft articles on the effects of armed conflicts on treaties. This act establishes such hierarchy of legal force: norm of humanitarian law as *lex specialis* (Article 2), treaties, which operates on the base of their subject matter (Article 7), including international environmental protection (item. g of annex), treaties, which itself contains provisions on its operation in in situations of armed conflicts (Article. 4), another treaties [9]. So, all mentioned sources of environment protection should operate during international armed conflicts with usage of space-based and ground-based space technologies. Also it should be noted that Article 9 of OST is environmentally friendly, and therefore should be applied preferentially, despite the fact that it is neither humanitarian nor ecological in its essence. Such conclusion can be confirmed by advisory opinion of International Court of Justice in case "Legality of the Threat or Use of Nuclear Weapons" of 08.07.1996. The Court argued that it was not treaties, but obligations stemming from these treaties were intended to be obligations of total restraint during military conflict. However, Court does not consider that the treaties in question could have intended to deprive a State of the exercise of its right of self-defence under international law because of its obligations to protect the environment. Respect for the environment is one of the elements that go to assessing whether an action is in conformity with the principles of necessity and proportionality [4]. So, let's consider the action of these principles during international armed conflicts in outer space and on the use of space-based ground-based systems.

The principle of military necessity is due to the desire to achieve the sole legitimate purpose of armed conflict, namely weakening of the military resistance of the enemy and the principle of proportionality is defined as a complex compromise between the protection of civilians and objects and military necessity [14; p. 877-878]. According to items 4 and 5 of Article 55 of Protocol I, actions that violate these principles are defined as attacks, during which military objects, civilians or civilian objects are attacked without distinguishing between them, which results in the civilian casualties, injuries and damage to civilian objects, or both together, which are excessive in relation to the specific and direct military advantage, which is supposed to achieve in this way [18].

Disabling of space objects remotely by means of telematics can cause significant damage to the civilian population if such object would belongs to dual-purpose objects and serves not only for military purposes, but also for the provision of emergency situations, civilian navigation. The loss of such means by the civilian population of the belligerent side will result in the deprivation of his life and health, not mentioning the loss of crop due to the lack of accurate meteorological information. All this is not incompatible with the principle of proportionality and violation of Article 54 Protocol I. If we draw a parallel with the outline of the proportionality of cybernetic attacks that do not violate the principle of proportionality, we can observe consequences of disrupting space objects that are associated with household inconveniences [13], such as the temporary lack of Internet coverage. But even this should be assessed on a case-by-case basis, because if rescue services did not work as a result of this, causing significant death or injury to people, this could also be the subject of an assessment of the violation of the principle of proportionality.

As was mentioned, the accuracy of the damage to space objects does not guarantee the avoidance of damage to civilian objects and persons who are in space. Furthermore, the unpredictability of movement trajectory of space debris, which is created as a result of such destruction, and a long period of its existence in orbit, makes such a method of armed conflict absolutely non-selective. This means that piece of space debris can affect a military or civil object of any, even non-defensive country, in an armed conflict or much later after its end. Such features make space object an installation that contains dangerous forces in the sense of Article 56 Protocol I, even when it does not have nuclear power sources. At the same time, in international practice, there are no known cases of extending this norm to installations other than the dikes, dams and nuclear plants, which are defined in this Article. This raises the problem of its application during international armed conflicts in space or using space technology.

The assessment of compliance with the principle of proportionality between the military necessity of operations in outer space or the use of space technology and the preservation of the natural environment should be made taking into account the interpretation of the last one in the advisory opinion of the International Court of Justice in case "Legality of the Threat or Use of Nuclear Weapons" of 08.07.1996. Court proclaims that environment is not an abstraction but represents the living space, the quality of life and the very health of human beings, including generations unborn. The existence of the general obligation of States to ensure that activities within their jurisdiction and control respect the environment of other States or of areas beyond national control is now part of the corpus of international law relating to the environment [4].

Article 55 of Protocol I and Article 1 of ENMOD Convention are fix three criterions that help to determine the proportionality of the adverse environmental impact during an armed conflict widespread, long-lasting or severe effect. As rightly notes Manoj Kumar Sinha, it is clear that the thresholds in the two instruments are framed with similar but not identical wording. The threshold in ENMOD is defined with disjunctive 'or' while in Additional Protocol I the adjective is cumulative 'and', that is why can be inferred that the ENMOD threshold is lower than that of Additional Protocol I [16]. All three criterions are estimated, so they should be established in a specific case and rely on the practice in this area. United Nations Environment Programme summarized this practice and gave an interpretation of these criteria: "Widespread" encompasses an area on the scale of several hundred square kilometers; "Long-term" is a period of months, or approximately a season; and "Severe" involves serious or significant disruption or harm to human life, natural economic resources or other assets [17]. In the event destruction of space objects, their fragments or released nuclear power sources will be distributed far beyond the boundaries of several hundred square meters, which will spread both outer space and Earth. Moreover, damage by cyber means or highly specific directed energy weapon with saving integrity of space objects [26] does not guarantee avoid of intentional or accidental collisions with neutral or hostile space objects with tragic consequences for long-term sustainability of space. It is worth mentioning only such a civil case as collision Cosmos 2251 and Iridium 33, in order to imagine what the consequences might be if the space objects would be out of order massively during armed conflicts. In this case, the time of their stay in orbit will reach tens and hundreds of years, and the consequences will be manifested in damage to other space objects, regardless of purpose and affiliation, peoples in space and on the Earth. Thus, according to the general rule, any failure of the space object will carry the risks that damage the natural environment of space and Earth, which violates the norm of international humanitarian law, enshrined in Article 55 of Protocol I.

### 3. CONCLUSIONS

The study of the principle of prohibition of use of force and threats in outer space and using space technology, as well as its application to protect the natural environment of space and Earth, made it possible to draw the following conclusions:

- Armed conflict in the near-Earth space in accordance with humanitarian law can be defined as an international armed conflict;
- The rules of international law that define the content and objects of the use of force or its threats that qualify as a prohibition do not contain such a direct prohibition for international armed conflicts in outer space;
- The most safe and peaceful basis for the use of force is the permission of the State exercising jurisdiction and control over the space object to allow external influence on such an object by means that can be qualified as weapons. Specifically, it is indicated that it is relevant for the implementation of projects for the active removal of space debris;
- The protection of near-Earth space and the Earth's environment during "space wars" is ensured by a number of international humanitarian, military, space and environmental laws that must operate in a comprehensive manner.

The principle of proportionality during international armed conflicts in outer space or the use of space technology in the context of the impact on the environment of space and Earth is very difficult to achieve without excessive harm to space environment, which is conditioned by the specific natural properties of the environment in which such armed conflicts occur.

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**Received:** 14.03.2018; **revised:** 21.06.2018.

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Гурова Анна Охорона природнього космічного середовища в світлі викликів “космічних воєн”. *Журнал Прикарпатського університету імені Василя Стефаника*, 5 (2) (2018), 107–114.

В статті проаналізовано особливості дії принципу незастосування сили і погрози силою в космічному просторі. Досліджується широкий спектр міжнародних актів, які можна застосувати для охорони космічного простору як природного середовища, від загроз, які несуть в собі міжнародні збройні конфлікти, зокрема норми міжнародного екологічного, космічного та гуманітарного права. Проведено паралелі з урегулюванням збройних конфліктів в кіберпросторі. Значна увага приділена дослідженню особливостей дотримання принципу пропорційності під час збройних конфліктів в космічному просторі з метою його охорони як цінного природного середовища.

**Ключові слова:** космос, війна, заборона застосування сили і загрози силою, *jus contra bellum*, *jus in bello*, MILAMOS, пропорційність, гуманітарне право, охорона навколишнього середовища, збройний конфлікт, космічне сміття.