Space Heritage: International Legal Aspects of Its Protection

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Abstract

The increasing involvement of States in the process of research and use of outer space, as well as the steady development of technical capabilities of space-faring commercial entities, entails a serious growth in the number of space flights. This may adversely affect the physical integrity and safety of the objects, which can be considered as space heritage for their undoubtful significance in the history of humanity. An international legal regime for a protection of such objects does not exist today. That is why necessity to analyse and summarize possible international legal aspects of the protection of historical and cultural heritage in outer space and on celestial bodies has grown and becomes the purpose of this paper.
The proposed thesis will consist of 3 chapters except introduction and conclusion.
The first chapter will examine the features of the legal status of 'space heritage'.
The second chapter will refer to existing practice of national initiatives into the preservation of space heritage. Thereby, the most vivid example in the field of State's practice will be non-binding document, 'NASA's Recommendations to Space-Faring Entities: How to Protect and Preserve the Historic and Scientific Value of U.S. Government Lunar Artifacts', which aims to preserve the U.S. artifacts on lunar surface. Another example is the bill 'One Small Step to Protect Human Heritage in Space Act', which aims to protect the historic Apollo 11 landing sites.
The last chapter will examine the different paths to establish appropriate protection of space heritage at the international level.

Keywords: space heritage, cultural heritage, UNESCO, space law

Acronyms/Abbreviations

COPUOS - Committee on the Peaceful Uses of Outer Space
IWHC - Intergovernmental Committee for the Protection of the World Cultural and Natural Heritage

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OST - Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies 1967
PTS - Planetary Transportation Systems GmbH
UHC - Convention on the Protection of the Underwater Cultural Heritage 2001
UN - United Nations
UNESCO - United Nations Educational, Scientific and Cultural Organization
UNGA - United Nations General Assembly
US - United States
WHC - Convention concerning the Protection of the World Cultural and Natural Heritage 1972

1. Introduction

The end of the second decade of the XXI century marked a new stage in space exploration, which is characterized by an increase in the number of space actors, the intensification of space flights and the growing threat of space activities from space debris. In such circumstances, the likelihood of irreparable damage to space heritage increases, which makes it necessary to establish a regime of international legal protection of such heritage.
This paper examines the applicability of treaties on the international legal protection of cultural heritage on Earth to objects of such heritage located in outer space. In accordance with the OST, the issues of protection of space heritage and environmental protection are compared, and certain aspects of international cooperation in this area are considered. Taking into account the assessment of national legal documents and initiatives in the field of protection of space heritage, possible ways of establishing protection of space heritage at the international legal level are determined.
The object of this scientific research is international legal relations that arise between States and international intergovernmental organizations regarding the protection of space heritage.

2. International Legal Status of Space Heritage

2.1. Classification of Space Heritage

At present, there is no international legal instrument in international law that directly regulates the protection of space heritage. Nevertheless, international space law treaties contain fundamental provisions in the field of space activities, on which further international legal regulation of the protection of space heritage should be based.

The fundamental principles of international space law are enshrined in the OST. These principles set out the criteria by which one can determine whether a given type of space activity is permissible under international law.[1]
Thus, the principle of freedom of exploration and use of outer space says that outer space and celestial bodies are open 'for exploration and use by all States without […] discrimination on the basis of equality and in accordance with international law'. It is easy to see that the wording of this provision is too broad to define exactly what activities in outer space fall within the scope of this principle. In other words, the OST does not explicitly imply that activities for the protection of space heritage comply with the principle of freedom and exploration of outer space by all States.[2]
Based on the content of the art. I of the OST, it is not clear what should be 'in the interests and for the benefit of all countries' – the activity itself or the results obtained in the course of its implementation. If the requirement applies to activities in outer space as such, then the protection of space heritage will not create any difficulties for its implementation, since it would be difficult to deny that such activities are not carried out 'in the interests and for the benefit of all countries'.
Thus, the exploration and use of outer space and celestial bodies must consider the ability of future generations to enjoy the freedom and benefits of such activities.
Various satellites, such as the American Vanguard-1, Telstar-1, Syncom-3, as well as objects on celestial bodies, including: sites with satellites, spacecraft, landing and mobile equipment, experiments left on the lunar surface, equipment, etc., are extremely rich in 'intangible' knowledge about past technological development. Such objects are one of the most important pieces of evidence of the evolution of human activities in outer space, which future generations could explore to learn more about past technological advances and human efforts beyond Earth.
The claim that the protection of space heritage is carried out 'in the interests and for the benefit of all countries' is also confirmed by the fact that, for example, objects located on the Moon are of exceptional scientific interest.
It is also necessary that space heritage should be preserved *in situ*, because this will allow them to be preserved in the context of their relationship to the environment in which they are located. This seems to increase the historical and scientific value of such objects, since: 'archaeologists rely on context as

1 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, 27 January 1967, https://www.unoosa.org/pdf/gares/ ARES_21_2222E.pdf, (accessed 10.09.20).
2 Hobe, S., Article I, in: S. Hobe, B. Schmidt, Tedd, K. Schrogl (Eds.), Cologne Commentary on Space Law. Volume 1, Heymanns, Cologne, 2009, pp.25-43.

the most important tool of interpretation'.[3] Such an idea can be extrapolated to the protection of space heritage in order to provide the most accurate study of, in particular, how environmental features affect the state of space heritage.[4]

Once again touching upon the protection of cultural heritage on celestial bodies, art. I of the OST establishes free access to all areas of celestial bodies for all States. Ensuring the protection of cultural heritage *in situ*, however, may have the effect of restricting or completely prohibiting access to the area where the heritage is located. However, it is necessary to ensure free access to such an area, subject to all restrictions and requirements imposed by the OST, in particular the requirement to carry out activities 'for the benefit and in the interests of all countries'. For example, Manfred Lachs pointed out that one of the agreed goals of the OST is that it is impossible for any state to assign exclusive rights or exercise rights at the expense of others.[5] At the same time, it should be noted that the unique environmental conditions of the Moon threaten the preservation of space heritage, since any careless action on the surface of the planet will lead to physical damage to cultural landscapes, which cannot be eliminated due to the lack of atmosphere as such. Therefore, restricting access to such heritage is a priority for the protection and preservation of its scientific and historical value and is in the interests of the entire international community.

Another aspect of the problem of establishing international legal protection of space heritage is the question of the relationship between space heritage and space debris. Is cultural heritage in space a space debris? And if it is, what should we do with it: protect it or dispose of it?

2.2. Space Debris or Heritage?

Over a long period of time in the exploration and use of outer space, humanity has launched countless man-made objects into near-earth orbits, including satellites, launch vehicle stages, mission-related debris, and other space debris. Only a small part of such objects can be qualified as a functioning spacecraft, but most of them are space debris. More than 500,000 pieces of space debris in Earth's orbit are currently being tracked.[6]

The space industry is now at a stage where the possibility of collisions with orbital debris increases dramatically, which poses a serious threat to the

3 Walsh, J. St. P., Protection of humanity's Cultural and Historic Heritage in Space, Space Policy, 28(4), 2012, pp.234-243.

4 O'Brien B.J., Paradigm shifts about dust on the Moon: From Apollo 11 to Chang'e-4, Planetary and Space Science, 156 (2018), pp.47-56.

5 Lachs M., The Law of Outer Space, Sijthoff, Leiden, 1972.

6 Gorman A., Heritage of Earth Orbit: Orbital Debris – Its Mitigation and Cultural Heritage, in: A.G. Darrin, B.L. O'Leary (Eds.), Handbook of Space Engineering, Archaelogy and Heritage, Springer, Cham, Taylor & Francis, Abingdon, 2009, pp.381-397.

further implementation of activities for the exploration and use of outer space, largely due to the Kessler's syndrome (effect). According to it, at a certain point in time, the collision of two sufficiently large space objects will generate a huge number of fragments, which, as in the case of the 'Domino effect', will collide with other debris in orbit, which will lead to a chain reaction and irreversible consequences for humanity. In the event of such a scenario, near-earth space will become unsuitable for practical use. However, the probability of such an outcome increases as the number of space objects in near-earth orbit increases.[7]

It should be noted that the definition of 'space debris' is disclosed only in international acts of 'soft law'. For example, space debris includes 'all man-made objects in near-earth orbit or returning to the atmosphere, including their fragments and elements that are non-functional'.[8]

The problems of protecting space heritage and preventing the spread of space debris are interrelated, since most of the objects that can potentially be recognized as space heritage are very similar in nature to space debris.

Thus, many objects sent into space should be considered simply as tools for carrying out relevant activities, which, after years of operation, either continue to function, but become obsolete in the context of the development of space technologies or cease to function. Given the huge numbers of tracked fragments of space debris in near-earth space, it becomes obvious that the vast majority of orbiting objects and their fragments and elements cannot be considered otherwise than undifferentiated, posing a threat to the further use of outer space and therefore subject to disposal. This approach is quite fair, provided that most of these objects are not very significant from the point of view of space archaeology. However, some of them still matter.[9]

In the context of the fact that cultural heritage is an irreplaceable resource, it should be protected and preserved *in situ*, since actions that have a harmful impact on the heritage will lead to irrevocable dispersal of cultural heritage objects and irreversible change of these objects. This would be detrimental to the needs and interests of other countries and future generations, since such objects are of unique significance in terms of the history of space exploration and the scientific development of the space industry.[10]

7 Kessler D.J., Cour-Palais B.G. Collision Frequency of Artificial Satellites: The Creation of a Debris Belt, Journal of Geophysical Research, A6 (1978), Vol. 83, pp.2637-2646.

8 United Nations Report of the Committee on the Peaceful Uses of Outer Space. Un Doc. A/62/20, https://www.unoosa.org/pdf/gadocs/A_62_20E.pdf, (accessed 10.09.20).

9 Walsh, J. St. P., Protection of humanity's Cultural and Historic Heritage in Space, Space Policy, 28(4), 2012, pp.234-243.

10 Lopez H. The Protection of Cultural Heritage Sites on the Moon: The Poo Bags Paradox, Protection of Cultural Heritage Sites on the Moon, Springer, 2020.

Although there are currently no rules in international law that define the categories of objects included in the concept of 'space heritage', it can be assumed that such objects may include: space objects, both operational and non-functional; their parts and elements; and environmental elements that are closely related to such heritage in their context and therefore have a unique value from the point of view of history and science (for example, the footprint of Neil Armstrong on the lunar surface). In order to prevent the threat of damage to space heritage in the context of ensuring the safety of space activities in the fight against space debris, it is necessary, first of all, to create an international legal mechanism for recognizing man-made objects in outer space as cultural heritage subject to protection.

2.3. International Legal Regime of the Space Heritage under Outer Space Treaties

The WHC stipulates that the recognition of an object as a cultural heritage is possible only with the consent of the state on whose territory the object is located.[11] However, in accordance with the art. II of the OST, it is an international territory. Will the exercise of jurisdiction and control by the state of registration of a space object be enough to recognize cultural heritage? In any case, the provisions of existing international treaties cannot be applied, as they currently exist, to the establishment and enforcement of international legal protection of such cultural heritage.

2.4. Applicability of the UNESCO Conventions

It is extremely important to ensure the protection of cultural heritage located in outer space at the level of the entire international community, for example, under the auspices of UNESCO, a specialized Agency of the UN, whose competence includes international legal protection of cultural heritage on Earth. As noted earlier, three conventions were adopted under the auspices of this organization: the 1954 Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict, the WHC, and the UHC.[12]

11 Convention concerning the Protection of the World Cultural and Natural Heritage, 16 November 1972, http://portal.unesco.org/en/ev.php-URL_ID=13055&URL_DO=DO_TOPIC&URL_SECTION=201.html, (accessed 10.09.20).

12 Convention concerning the Protection of the World Cultural and Natural Heritage, 16 November 1972, http://portal.unesco.org/en/ev.php-URL_ID=13055&URL_DO=DO_TOPIC&URL_SECTION=201.html, (accessed 10.09.20); Convention on the Protection of the Underwater Cultural Heritage, 2 November 2001, http://portal.unesco.org/en/ev.php-URL_ID=13520&URL_DO=DO_TOPIC&URL_SECTION=201.html, (accessed 11.09.20); Convention for the Protection of Cultural Property in the Event of Armed Conflict with Regulations for the Execution of the Convention, 14 May 1954, http://portal.unesco.org/en/ev.php-URL_ID=13637&URL_DO=DO_TOPIC&URL_SECTION=201.html, (accessed 10.09.20).

The application of the first of them in determining the specifics of the regime for the protection of space heritage in peacetime currently seems impractical, since its provisions are mainly applied in the course of armed conflict. This is also confirmed by the fact that, in accordance with art. IV of the OST, outer space and celestial bodies are partially demilitarized and fully demilitarized territories, respectively.

The scope of the WHC, which could potentially be extended to the protection of space, is therefore assumed to be more appropriate. However, what makes the WHC inapplicable to the protection of values in space?

Firstly, space heritage does not fall under the categories of heritage established by art. 1, 2 of the WHC.

Secondly, with regard to space heritage located on celestial bodies, in particular on the Moon, the WHC is not applicable, since it requires that objects be under the jurisdiction of States, and such a state is responsible for maintaining and protecting the object.

In addition, it is also impossible to extend the scope of the WHC to protect space heritage by making amendments directly to the text of the WHC itself or by adopting a new protocol. Because that the WHC is subject to review by the UN General conference. From the date of entry into force of the new international treaty the WHC will be closed for ratification, acceptance or accession, while the revised Convention will only bind those States that recognize the binding force of the provisions of the new Convention.

Turning to the UHC, we note that it refers to those objects of cultural heritage that are underwater. In this regard, it cannot be applied to the protection of space heritage.

None of the above-mentioned conventions is fully suitable for regulating the protection of space heritage. However, some of their provisions may be useful in developing an international legal regime for the protection of such heritage. This will be discussed below.

No attempts are currently being made to establish the international legal regime for the protection of space heritage. Such efforts are limited only to the implementation of certain initiatives at the national level.

3. National Practice in Preservation of Space Heritage

The main efforts to protect space heritage at national level concern objects located on celestial bodies, primarily on the Moon. This relates to growing interest of states in the context of investigating the Moon. All existing initiatives in this field were started by USA.

3.1. NASA's Recommendations to Space-Faring Entities: How to Protect and Preserve the Historic and Scientific Value of U.S. Government Lunar Artifacts

NASA's recommendations were adopted in July 2011.[13] This document describes the various ways in which a transport vehicle can damage a historic property when approaching it.

In addition, it states that NASA seeks to coordinate, on a preliminary basis, lunar activities that could affect NASA's artifacts of historical and scientific significance to ensure that all relevant interests are recognized and protected.

NASA's Recommendations set a no-go zone around lunar heritage sites, defined as 'recommended border zones that visiting spacecraft cannot enter', in the range of 0.5 to 2.0 km of radial distance.

At the same time, the document stipulates that such recommendations are 'compatible with the provisions of international law [...], the OST'.

Currently, such a recommendation does not violate art. I, II of the OST, which establish freedom of access to all areas of celestial bodies and the prohibition of national appropriation of outer space, respectively.

These recommendations are not a legally binding, they do not entail any legal consequences if they are violated.

The approach of NASA, which provides recommended standards for those entities engaged in space activities near American lunar artifacts, may one day form the basis for international obligation to consult under the art. IX of the OST on the protection of space heritage.[14]

3.2. Congress: Apollo Lunar Landing Legacy Act

The first legislative initiative to establish the protection of space heritage at national level was made on July 8, 2013 at the 113th session of US Congress, where Apollo Lunar Landing Legacy Act was considered.[15]

As indicated in the bill, it aims to establish the National Historical Park on the Moon and to protect for the benefit of present and future generations the Historical Park, which includes all Apollo lunar landing sites.

Nevertheless, the bill was not adopted. The reason is that the OST directly prohibits the national appropriation of outer space and celestial bodies by proclaiming sovereignty over them, through use or occupation, and by other

13 NASA's Recommendations to Space-Faring Entities: How to Protect and Preserve the Historic and Scientific Value of U.S. Government Lunar Artifacts, https://www.nasa.gov/pdf/617743main_NASA-USG_LUNAR_HISTORIC_SITES_RevA-508.pdf., (accessed 10.09.20).

14 Rotola, G., The Legal Framework Protecting Cultural Heritage Sites on the Moon and In Situ Preservation, in: A. Froehlich (Ed.), Protection of Cultural Heritage Sites on the Moon, Springer, Cham, 2020, pp.1-12.

15 Apollo Lunar Landing Legacy Act. H.R. 2617 (113th), 8 July 2013, https://www.govtrack.us/congress/bills/113/hr2617, (accessed 10.09.20).

means, which makes the creation of a national park on the moon in violation of postulates of international space law.

3.3. One Small Step to Protect Human Heritage in Space Act

On May 2019 the US Congress reaffirmed its interest in outer space and introduced the One Small Step To Protect Human Heritage in Space Act as a new step to protect space heritage.[16]

On July 10, 2019, the revised text of the bill was approved without discussion or vote by the Committee on Trade, Science and Transport. On 31 December, 2020, the bill was signed by the President.

The main goal of the bill is to ensure the recognition and protection of the Apollo landing site and other historical landing sites from threats posed by the modern development of space activities.[17] Such a legislative initiative might be considered innovative in a certain sense. In case of its adoption, the bill can potentially set a precedent for the future development of legal regulation of the protection of space heritage, both at the national and international levels.

The bill requires that any space participant required to obtain a license from the US government to operate on the Moon must comply with the NASA's Recommendations of 2011. If consent to the implementation of the recommendations is not given, then the license may be revoked by the Federal Agency authorized to issue it.

In the event of a violation, the federal licensing authority may assess a penalty fee 'commensurate with the nature and extent of the violation' and 'sufficient to deter future violations'.

Nevertheless, the wording of the exemption clause in the bill does not provide for any criterion or element regarding the assessment of what may be an activity of legitimate and significant historical, archaeological, anthropological, scientific or engineering value, thereby leaving the assessment rules to the discretion of the US federal licensing authority and provides a *de facto* opportunity to refuse licensing for all activities on the moon in which space participants are interested.

In addition, the bill does not offer an exhaustive list of protected sites or criteria for their definition.

16 One Small Step to Protect Human Heritage in Space Act. S.1694, 23 May 2019, https://www.govtrack.us/congress/bills/116/s1694, (accessed 10.09.20).

17 Perzos, G., One Small Step to Protect Human Heritage in Space Act as One Small Step Towards U.S. Space Dominance? The Case for a Multilateral Treaty Protection Regime, in: A. Froehlich (Ed.), Protection of Cultural Heritage Sites on the Moon, Springer, Cham, 2020, pp.40-52.

4. Paths to Establish International Protection of Space Heritage

4.1. International Protection of Space Heritage under Auspices of UNESCO

Attempts are currently being made at the national level to establish a legal regime for the protection of cultural heritage in outer space. However, such a regime is based on the rules of domestic law, meaning that its scope is limited to those areas over which the state exercises sovereignty, which means that it is not sufficiently effective.

In this regard, it is extremely important to ensure the protection of space heritage at the level of the entire international community, for example, under the auspices of UNESCO.

Currently, it is not possible to establish such legal protection under the auspices of UNESCO within the framework of existing conventions of the UNESCO. Because space heritage does not fall under any category of heritage protected by these conventions. Nevertheless, some provisions of these conventions may provide a useful basis for developing the international protection of space heritage.

4.1.1. Provisions of the WHC

The preamble to the WHC contains an important provision that reads as follows: 'that parts of cultural or natural heritage are of outstanding interest, and therefore need to be preserved as part of the world heritage of mankind as a whole' [10]. This provision can be a good model for the protection of space heritage.

Such a model should not be limited to the nationalistic interests of states, but should be considered as the province of all mankind, as established in art. I of the OST.

In addition, the WHC, in its art. 11, obliges States, to the extent possible, to submit a list of objects of cultural and natural heritage located within their territorial jurisdiction that meet certain criteria.

Subsequently, the IWHC selects the objects to be included in the 'World Heritage List', as well as in the 'List of World Heritage in Danger'. At the same time, the inclusion of a heritage object in these lists is carried out only with the consent of the state party concerned.

If several States challenge the exercise of their sovereignty or jurisdiction over a listed cultural heritage item, such inclusion does not affect the rights of the disputing parties in any way.

Thus, the above suggests that ensuring the effective protection and preservation of such objects of cultural and historical value is higher than the issues of exercising sovereignty or jurisdiction over such objects. In other words, this formulation can also serve as a good model for the protection of space heritage, in particular, the development of a certain principle of 'necessary protection» of space heritage, which is the province of whole mankind, regardless of their state affiliation.

Among other things, this idea is supported by art. 6 of the WHC, which recognizes the sovereignty of states over world heritage sites, does not infringe on the rights established by national legislation, but at the same time recognizes such objects as universal heritage, which must be protected through international cooperation.
The following art. 7 gives the definition of 'international protection', meaning a system of international cooperation. Such a system should form the basis for the formation of a new universal agreement on the protection of space heritage, providing for principles governing the exploration and use of outer space for this purpose.

4.1.2. Provisions of the UHC

It is clear from the preamble that the scope of the UHC can be 'adapted' to the purposes of protecting space heritage. Thus, States Parties 'convinced of the public's right to enjoy the educational and recreational benefits of responsible non-intrusive access to *in situ* underwater cultural heritage, and of the value of public education to contribute to awareness, appreciation and protection of that heritage'.[18] This provision concerns underwater cultural tourism, as well as the right of people to access such objects of unique historical and cultural value.
It is possible that the space environment will soon also become accessible to the public in terms of technical capabilities for mass tourism, and there will be a need to regulate responsible and harmless access to such objects in space.
The UHC prioritizes the conservation *in situ* of an underwater cultural heritage 'before allowing or engaging in any activities directed at this heritage'.
The art. 1 of the UHC also defines underwater cultural heritage. Its wording may be useful in determining what is included in the concept of cultural heritage located in outer space, since such a definition excludes natural objects and sets an age threshold of 100 years for understanding the cultural element of such objects.

4.2. Other Instruments for International Protection of Space Heritage

The adoption of another universal international treaty for the protection of cultural heritage located in outer space and celestial bodies is the best solution for establishing and specifying an international legal regime for space heritage, particularly, guarantees for its preservation.
Such a treaty can be adopted within the framework of UNESCO or another international body, for example, within the framework of COPUOS.

18 Convention on the Protection of the Underwater Cultural Heritage, 2 November 2001, http://portal.unesco.org/en/ev.php-URL_ID=13520&URL_DO=DO_TOPIC&URL_SECTION=201.html, (accessed 11.09.20).

However, the process of acceptance and accession of states to the new treaty may take many years, and the need to ensure the protection of space heritage will definitely soon appear on the agenda of the international community due to the growing threat of harm and loss of such heritage.
The most likely solution to this issue now consists in the development of international acts of 'soft law'.
Although such acts are not legally binding, they allow states to bring all existing practices in the implementation of certain types of space activities to uniformity, to develop new general approaches to the implementation of a particular type of activity.
In addition, such acts are easier to develop and revise. Such acts form the preconditions for the subsequent creation of an international treaty in the field of exploration and use of outer space, and contribute to the progressive development of international space law.

5. Discussion

This topic is extremely promising from the point of view of its further study, since activities for the protection of space heritage are related to various issues that must be properly resolved, for example, issues of safety and space debris control.
Thus, the international community has yet to decide on objects that fall under the category of «space heritage» and to ensure international legal frameworks for protection and preservation of space heritage.
The question is whether a new international agreement is needed for these purposes or whether it is possible to do only with the development of acts of 'soft law'.

6. Conclusions

Thus, conclusion can be made, that it is necessary to specify the issue of protection of space heritage, first of all, by developing in a future international legal regime based on the provisions of existing international treaties in the field of protection of cultural heritage on Earth, the principles and provisions established by the OST, also taking into account 'soft law' documents. All this can help in the future to develop a new international agreement on the protection of cultural heritage in space.