

Sanitary Protection and Space Activities

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The events of 2019-2020 have drawn attention to the threats that can be caused by uncontrolled outbreaks of poorly researched viral or infectious diseases. Sanitary (sanitary and epidemiologic) legislation is of certain importance in countering the epidemic. Its shortcomings are now evident, and significant improvements will be made in the near future at both national and international levels. Changes in the approach to space activities and their commercialization will soon lead to the regular impact (return) of objects of extraterrestrial origin or objects which have been in direct contact with them to the Earth. The issue of protection against possible entry of unexplored mass diseases of extraterrestrial origin into the planet remains unfaced. It is our hypothesis that such entry, particularly of viruses, is not excluded and could pose a significant threat to humanity. We develop proposals to establish a legal and regulatory framework to counter and overcome these threats. These proposals should be considered in modernizing the International Health Regulations and other health legislation.

Keywords: space activities; sanitary protection; organisms of extraterrestrial origin.

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Introduction

The COVID-19 coronary pandemic has once again reminded humankind of the extremely high threat posed by the uncontrolled spread of infectious and viral diseases. Once again, we speak because these diseases are much longer known to mankind than the concept of “virus” and “infection.” The countermeasures for them and, above all, quarantine have been intuitively developed and applied in Europe since the 13th century. At that time, it became clear to specialists that the spread of the disease was linked to migration, international trade and the movement of infected citizens for other reasons.

With the passage of time and the accumulation of knowledge, the professional community had come to the logical conclusion that countermeasures for infectious diseases would be more effective if different States worked together to combat them and establish common protocols (rules) to prevent the spread of such diseases. This conclusion was not only logical but purely utilitarian since the development of transport and communications and the growth of international trade increased the risks of the spread of infectious and viral diseases.

International sanitary regulations: Genesis and application characteristics

In 1851, the first International Sanitary Conference implemented it. On July 23, at the French Government’s initiative, representatives of 12 States met in Paris and initiated the drafting of the world’s first Sanitary Convention. The practical implication of this international instrument is negligible. More important is the convening of an inter-State sanitary conference in which both diplomats and doctors have been involved (Golubyatnikov et al., 2014).

Between 1851 and 1938, international conferences were convened fourteen times, and many of them were of great medical and legal significance.

In particular, the Fourth Vienna Conference of 1874 established the Permanent International Sanitary Commission having as its object the study of epidemic diseases. No such commission was established de facto, but the material produced was the basis for the establishment of the first international medical organization, the International Bureau of Public Hygiene (Golubyatnikov et al., 2014: 197) in 1907. This body was the predecessor of the World Health Organization (hereinafter referred to as WHO). That is, it was the Fourth International Health Conference that took the first step towards organizing and institutionalizing international cooperation in health in general.

In 1892, the Seventh Venice Conference adopted the first International Sanitary Convention, and the thirteenth Paris Conference, attended by more than fifty States, replaced it with the improved 1926 International Sanitary Convention (Howard-Jones, 1976: 75-77, 113-117).

The dismantling of the International Bureau of Public Hygiene took place against the backdrop of the formation of the United Nations Transitional Institutions, taking its powers (Cliff & Smallman-Raynor, 2013: 41-42). In 1948 it was replaced by the World Health Organization at the United Nations. The decision to establish WHO had been taken earlier, but it was not until 1948 that it came into being. At the beginning of its activities, the world community abandoned the practice of implementing sanitary conventions, replacing them with the International Sanitary Regulations.

This was due to the fact that, according to the WHO Constitution, on the one hand, its objective is the attainment of the highest possible level of health. Its functions are to establish

and maintain such administrative and technical services as may be required, including epidemiological as well as to advance work to eradicate the epidemic. On the other, in order to fulfill these functions, the Assembly (the highest body of WHO) is authorised to establish the rules of sanitary and quarantine requirements and other activities against the international spread of diseases (Global, 2003).

Such rules do not require ratification and are binding on WHO members after due notification by the WHO Assembly of their adoption, except in special rejection of Regulations.

The WHO Assembly adopted the first International Health Regulations in 1969. They have been amended and supplemented frequently. The International Health Regulations (hereinafter referred to as the IHR) adopted by the 58th WHO Assembly in 2005 are now in force worldwide. They do not provide answers to the real problems associated with the emergence and spread of COVID-19 and require not just additions or changes but also a fundamental rethinking of the approach to counteracting viral, infectious, and other health threats the world. One of the changes in approach is to consider viral and other space-related health threats.

Space exploration and sanitary and epidemiological protection of the Earth

A number of international legal instruments focus on the exploration and use of outer space. The main ones are the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies of 1967; the Agreement on the establishment of the “Intersputnik” international system and the Organization of Space Communications of 1971; the Convention on International Liability for Damage Caused by Space Objects of 1972; the Convention on Registration of Objects Launched into Outer Space of 1974; the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies of 1979. A common problem with these regulations is that many States refuse to participate in them. For example, more than 100 states have ratified the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, 89 States have ratified the 1972 Convention and 64 States have ratified the 1974 Convention, and only 18 states have ratified the Agreement Governing the Activities on the Moon and Other Celestial Bodies. On the other hand, now, space exploration is increasing notably and, importantly, it is changing its nature significantly. As a result, it transcends the legal framework established in the 1970s. Some attempt to remedy this situation through national legislation. For example, the US has adopted the Commercial Space Launch Competitiveness Act. However, such actions may lead to conflicts and controversies at the highest level (Committee, 2016; Oduntan, 2015, Bennett, 1988; de Selding, 2015; Masson-Zwaan & Richards, 2015; Rummel, 2015; Koerth-Baker, 2015).

For our study, it is important that, so far, space activities have been confined to the exploration and use of near-Earth space and have not involved the delivery to the Earth of extraterrestrial material or equipment that has come into direct contact with other celestial bodies. Contact with such bodies was extremely limited, even exceptional.

A number of programmes are being developed and introduced for the mining of minerals in space, the exploration of the Moon, and return flights to other celestial bodies. Moreover, private companies, not States, would be the actors. In our view, in addition to the commercial attractiveness and obvious benefits of space projects, the possible risks and

threats associated with such activities should be under focus. One is the threat regarding sanitation and virology.

Briefly, the level of scientific understanding of the range of issues involved will be described. The origin of life on Earth is not solved and remains a promising area of scientific research. At least four common (recognized) hypotheses and a number of less well-known ones can be distinguished. At least some of them do not rule out the possibility of life outside our planet. In addition, the issue of viruses remains unresolved, and virologists have developed a number of hypotheses in this regard. However, it is obvious that the virus is one of the oldest and simplest forms of life. In other words, viruses evolved close to the first life forms. It should be noted that the existence of organic life forms in space is supported by various facts (for example, the identification of residues characteristic of biological life forms on our planet in carbon-bearing meteorites). Furthermore, the possibility of life on planets of the solar system, especially on Mars (see, for example, the proceedings from European Astrobiology Conferences) are discussed frequently.

We restrict ourselves to stating that, at least theoretically, extraterrestrial life forms may come to our planet. It is indisputable in the scientific community and is reflected in the Committee on Space Research's Planetary Protection Policy (COSPAR, 2020). This body was established in 1958 at the International Science Council. A long period of time, the Panel on Planetary Protection works in the Space Research Committee. It studies and analyses biological interchange in the conduct of solar system exploration and use, including the issues of "possible effects of contamination of planets other than the Earth, and of planetary satellites within the solar system by terrestrial organisms; and contamination of the Earth by materials returned from outer space carrying potential extraterrestrial organisms" (Panel, 2020). According to NASA, they try to adhere to the principles provided by the Committee on Space Research's Planetary Protection Policy as much as possible (Grush, 2018).

However, it should be noted that the Planetary Protection Policy is not a legal regulation and is not binding. It is a general information document. Furthermore, from our perspective, like the international treaties on the exploration and use of outer space, it does not take into account the inevitable commercialization of space activities and the significant growth in a limited time frame of not only the return of materials from outer space, but also the regular delivery of extraterrestrial materials to the planet.

In our opinion, the first requirement for the exploration and use of outer space should be to ensure the protection of the world's population from the results of such activities.

Adherence to uniform, universal rules, which shall be enshrined in an international instrument, is a requirement for the return of materials from outer space and the delivery to the planet of materials of extraterrestrial origin. Four basic questions it should address are:

- a) conditions of sanitary and epidemiological protection of the Earth (hereinafter referred to as "sanitary protection");
- b) definition of powers and delimitation of competencies between executors of quarantine activities and other instruments of sanitary protection;
- c) rules for the exchange of information and transparency in sanitary and epidemiological protection;
- d) conditions and procedures for the compensation of damage caused by the delivery to the Earth of organisms of extraterrestrial origin.

The first of these issues requires considerable work by astrobiologists and can rely on the principles of the Committee on Space Research's Planetary Protection Policy to be solved.

With regard to the executers, the basic approach should first be defined. There are several such approaches.

First, a national approach. According to it, the control and responsibility for space objects is exercised by the State within jurisdiction thereof the objects are located. This is the approach that prevails in the existing international treaties governing space activities. It was fully justified, provided that space activities were carried out exclusively by States. Their commercialization poses a number of challenges. For example: (a) the space object may be jointly owned by several legal entities registered in different States; (b) the owner of the space object and its user are not one and the same; (c) all the work of the company on the development, construction, launch and return of a space object can be carried out on the territory of one State, and the company itself is registered in another; (d) others. Most of them could be addressed by improving the registration of space objects established by the 1974 Convention on Registration of Objects Launched into Outer Space, but it should be considered that only 64 states had ratified the Convention.

Second, a territorial approach. According to it, sanitary protection measures shall be carried out by the State on whose territory the object has been launched into outer space. Large space-faring nations always aim to ensure that spacecraft land within their own territory, so for them, the differences between the first and second approaches are insignificant. It would be much more difficult for space-faring nations with limited territories, such as Israel. On the other hand, it is now common for an object to be splashed down in neutral waters. This approach does not answer who in such a case is authorized to carry out sanitary measures.

Third, an international approach. According to it, the powers of planetary protection should be transferred to an international organization. Obviously, this organization will not be WHO, which has shown itself to be incapable of counteracting even earth-based viruses. However, several international organizations may merge to accomplish this task, for example, the very WHO, the UN Committee on the Peaceful Uses of Outer Space, or its body, the UN Office for Outer Space Affairs. On the other hand, a new specialized international body focused exclusively or primarily on planetary protection could also be established. At least the analysis of the material of the Panel on Planetary Protection of the Committee on Space Research gives us reason to believe that such a solution would be appropriate.

Four, a combined approach. Within it, the three approaches mentioned above can be combined in various ways, for example, by entrusting the State where the object launched into space is registered with sanitary protection measures while entrusting an international organization(s) with identifying the range of measures and monitoring their completeness and accuracy.

In addition, other approaches to international cooperation in the field of sanitary and epidemiological well-being have been developed around the world (see, for example, the work by Natalia Sazhiienko (Sazhiienko, 2011).

With regard to specific powers and their delimitation, they require prior ensuring conditions for the sanitary and epidemiological protection of the planet and the range of actors involved.

The establishment of rules for the exchange of information and the sanitary protection procedure's transparency is an easier task since it can involve a vast experience in international cooperation, as reflected in the very 2005 IHR or even earlier IHR and International Sanitary Conventions.

The conditions and procedure for compensation for damage caused by the delivery to the Earth of extraterrestrial origin organisms is perhaps the most difficult issue. It should be noted that the provisions of the Convention on International Liability for Damage Caused by Space Objects cannot be applied here. While its requirements are sufficiently broad to be interpreted in a variety of ways, it refers to direct damage caused by a technical device. In our case, the damage is not caused by the space object itself but by extraterrestrial organisms' entry.

Three fundamentally different situations are possible. The first is when viruses or other forms of life are brought to the Earth despite the implementation of all forms of global sanitary protection provided for by international treaties and the observance of all security protocols. The second is when extraterrestrial life forms are brought to the Earth as a result of noncompliance by the subject involved in space activities with sanitary measures, their implementation prevention, etc. Third, when viruses or other forms of life are brought to the Earth as a result of improper implementation of sanitary protection measures by the controlling entity. The scope and extent of compensation for damages to each of them should be determined differently, although the procedure for cases may be general.

Therefore, the legal provisions on the conditions for the planetary protection, the executors, and their powers, as well as the transparency of sanitary protection and the exchange of information on its implementation, may be included in existing or new IHR, which are duly adopted by WHO.

The question of compensation for damage caused by the delivery to Earth of extraterrestrial organisms should be settled in a separate international treaty. On the one hand, it is somewhat isolated from the first three and is only indirectly related to health regulations. On the other hand, it can be predicted that adopting and ratifying a treaty concerning legal responsibility will cause difficulties. As mentioned above, the 1972 Convention on International Liability for Damage Caused by Space Objects has now been ratified by only 89 States, some of which are not involved in space activities. Provided the legal rules on the sanitary protection of the planet and the responsibility for its contamination in different regulations, it is possible to speed up the procedures for the adoption of the former. In general, a regulatory legal framework for the sanitary and epidemiological protection of the planet is an urgent task due to the security of mankind.

Conclusions

Nowadays, natural sciences, especially astrobiology, have developed a number of approaches to Planetary Protection against the entry of extraterrestrial life forms that can damage the Earth's biosphere in the broadest sense. In general, they are reflected in the Committee on Space Research's Planetary Protection Policy. However, there is no legal basis for the implementation of this Policy and other means of planetary and population protection against negative biological factors that could be caused by space activities.

Inevitably, space commercialization will cause a significant increase in the flow to our planet of materials, spacecraft, and even individuals who have contact with space bodies and other objects of space origin. However, the activities of corporations involved in space activities are constantly faced with the choice between the growth of incomes and increased expenditures for protection measures.

Under such circumstances, the security of mankind requires the development of a range of international instruments governing planetary protection. Primarily, these issues should include (a) conditions of sanitary and epidemiological protection of the Earth; (b) identification

of the protection executers; (c) definition and delimitation of their competencies regarding instruments (methods) of sanitary protection; (d) quarantine specificities in space activities; (e) rules for information on the progress and results of the sanitary protection of the Earth; (f) resolution of questions related to compensation of damage caused by the delivery to the Earth of organisms of extraterrestrial origin.

Legal standards for the sanitary protection of the Earth can be established both in new international instruments and in existing ones. One option is to amend and supplement the WHO International Health Regulations. Furthermore, this method of the establishment seems to be feasible due to certain features (simplified procedure) of adopting WHO regulations.

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