

# The environmental liability in outer space mining

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International environmental liability is one of the oldest concepts, which regulates international relations, especially neighborly. Although it derives from the Roman law, the disputes such as *Trail Smelter*<sup>1</sup> or *Corfu Channel*<sup>2</sup> show its actuality. The standpoint of the international and arbitral courts has built the widely accepted standard that each state is obliged to respect the environment of other states or the environment beyond the limits of its national jurisdiction<sup>3</sup>. Unfortunately, when the fundamental principles of space law were drafted, such considerations were not often discussed in the doctrine or practice. Not surprisingly, space treaties do not contain any direct provisions in regard to environmental liability. Moreover, they have relatively little to say about protection of environment in outer space. Environmental issues in international space law have become a subject of studies only recently, but fortunately they are more and more often present in the work of many world recognized institutions, for example: the United Nations Committee on the Peaceful Uses of Outer Space, European Space Agency, International Academy of Astronautics, International Law Association or Inter-Agency Space Debris Coordination Committee, etc. Although the environmental protection is still not the first ranking challenge for international space law, the environmental hazards in outer space pose a variety of threats to the human space activities and even life on Earth. The discussion about environmental space law began from the problem of space debris, but it has expanded into the new areas of interest, including outer space mining<sup>4</sup>.

The mining activities, regardless whether conducted on Earth or in the space, are undoubtedly risky and dangerous. They cause the risk of injury, loss or damage not only to miners or the third parties, but also to the environment. It is hardly surprising, that the liability for any damages made in the space is the crucial issue for state's and entrepreneurs acting in the outer space. The modern liability controversies in regard to commercial mining in outer space are connected with calculation damage, launching party, space object, fault

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<sup>1</sup> [http://legal.un.org/riaa/cases/vol\\_III/1905-1982.pdf](http://legal.un.org/riaa/cases/vol_III/1905-1982.pdf) (last accessed on 3 March 2015).

<sup>2</sup> <http://www.icj-cij.org/docket/files/1/1645.pdf> (last accessed on 3 March 2015).

<sup>3</sup> Express for example in Principle 21 of the Declaration of The United Nations Conference on the Human Environment, having met at Stockholm from 5 to 16 June 1972, see: <http://www.unep.org/Documents.Multilingual/Default.asp?documentid=97&articleid=1503> (last accessed 3 March 2015).

<sup>4</sup> For example the Committee on Space Research works on planetary protection or environmental effects on space activities, see: <https://cosparhq.cnes.fr/events/co-sponsored-meetings> (last accessed 3 March 2015).

and nuclear power sources<sup>5</sup>. However, from environmental perspective the most important is the description of the damage and launching party.

### **Definition of the environmental damage in international space law**

From the view of the space miner's environmental liability, the fundamental issue to solve is the question about the definition of the environmental damage. Unfortunately, such definition was not included in any of international space treaties. Although, the liability for space activities was subject of debate from the early beginning of the international space law, concluded agreements regulate only definition of the general liability for damages. For instance, the Liability Convention<sup>6</sup> does not contain a definition of the environmental damage<sup>7</sup>, but it does define the damage. According to its article 1 "*the term damage means loss of life, personal injury or other impairment of health, or loss of or damage to property of States or of persons, natural or judicial, or property of international intergovernmental organizations*". Regrettably, the above definition does not include any elements, which could be used as a basis of the environmental claim. These elements can be found however in the Moon Agreement<sup>8</sup>. In accordance to its article 7 "*in exploring and using the Moon, State Parties shall take measures to prevent the disruption of the existing balance of its environment, whether by introducing ad verse changes in that environment, by its harmful contamination through the introduction of extra-environmental matter or otherwise*". Although, the Moon Agreement does not contain the definition of damage and its provisions do not have *erga omnes* effect<sup>9</sup>, it is considered to be the first step to creation the environmental liability provision in space law. The stronger arguments for building such liability in regard to activities in space can be found in Outer Space Treaty<sup>10</sup>. According to its article I "*the exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries irrespective of their degree of economic or scientific development, and shall be the province of all mankind*". Moreover in the article IX of the treaty "*States Parties to the treaty shall pursue studies of outer space, including Moon and other celestial bodies, and conduct exploration of them so*

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<sup>5</sup> Ricky J. Lee, *Law and Regulation of Commercial Mining of Minerals in Outer Space*, Dordrecht Heidelberg London New York 2012, p. 142-151.

<sup>6</sup> Convention on International Liability for Damage Caused by Space Object reached in the General Assembly of the United Nations, opened for signature on 29 March 1972, entered into force on 1 September 1972 (resolution 2777 (XXVI)), see: <http://www.unoosa.org/oosa/SpaceLaw/liability.html> (last accessed on 3 March 2015).

<sup>7</sup> See: Carl Q. Christol, *International Liability for Damage Caused by Space Objects*, American Society of International Law 1980, vol. 74, p. 346-347.

<sup>8</sup> Agreement Governing the Activities of States on the Moon and Other Celestial Bodies adopted by the General Assembly of the United Nations, opened for signature on 18 December 1979, entered into force on 11 July 1984 (resolution 34/68), see: <http://www.unoosa.org/oosa/SpaceLaw/moon.html> (last accessed on 3 March 2015).

<sup>9</sup> According to F. Tronchetti "*the Moon Agreement has not been ratified by the major space powers and therefore its provision cannot be considered to have erga omnes effect*", F. Tronchetti, *The exploitation of natural resources of the Moon and other celestial bodies. A proposal for a legal regime*, Leiden Boston 2009, p. 268.

<sup>10</sup> Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies reached in the General Assembly of the United Nations, opened for signature on 27 January 1967, entered into force on 10 October 1967 (resolution 2222 XXI), see: <http://www.unoosa.org/oosa/SpaceLaw/outerspt.html> (last accessed on 3 March 2015).

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". Therefore, mining activities in outer space, which cause the environmental damage, could be treated as a violation of the treaty obligation and a wrongful act. Consequently, the State causes such damage will be responsible towards the other Party and according to some authors "obliged to reparation in the form of restitution and/or compensation and/or satisfaction"<sup>11</sup>. However, contamination in space is usually hard to remove or it is even materially impossible. The cost of such operation can be also higher than the value of the caused damage, thus the most expected solution would be the payment of a financial compensation. The Party entitled to receive the compensation is every other State- a party of the Outer Space Treaty, who can also raise a claim. It is a consequence of the fundamental space law rule, according to which the outer space is a 'province of all mankind'. In my opinion, this statement is support with the necessity to obtain a license for exploitation of natural resources of the moon and other celestial bodies. It is expected that the license will include among others the obligation to avoid contamination and to protect the environment, all of which would strengthen the doctrine of environmental liability in the space law.

### **Definition of the environmental damage in international public law**

As it was emphasized above, the international space law does not provide the definition of environmental damage. From my point of view, it can be however deduced from the provisions of the international environmental law and general space law.

In the literature of international environmental law the definition of the environmental damage is split into the narrow and broad definition. The narrow definition covers the environmental damage caused to the part of the environment, such as air, water, etc. The broad definition includes also undefined elements, such as cultural heritage, landscape or recreational values. None of the definitions contain however issues regarding the personal injury or property damage. It is characteristic to international environmental treaties, because most of them use quite precise definition of the pollution treating the definition of damage as a general clause<sup>12</sup>. Moreover, some of the treaties use the term "adverse effects" instead of the term "damage"<sup>13</sup>. Also the language of the judicial decisions is not uniform. Some of them are silent about the environmental damage<sup>14</sup>, some implicate

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<sup>11</sup> F. Tronchetti, *op.cit.*, s. 268.

<sup>12</sup> For example: art. 1 of the 1979 Convention on Long-range Transboundary Air Pollution defines air pollution "as "introduction by man, directly or indirectly, of substances or energy into the air resulting in deleterious effects of such a nature as to endanger human health, harm living resources and ecosystems and material property and impair or interfere with amenities and other legitimate uses of the environment, and "air pollutants" shall be construed accordingly" (see: <http://www.unece.org/fileadmin/DAM/env/lrtap/full%20text/1979.CLRTAP.e.pdf>, last accessed on 3 March 2015).

<sup>13</sup> See: art. 1 of the 1992 United Nations Framework Convention on Climate Change (<http://unfccc.int/resource/docs/convkp/conveng.pdf>, last accessed on 3 March 2015) or art. 1 of the 1985 Vienna Convention for the Protection of the Ozone Layer ([http://ozone.unep.org/new\\_site/en/Treaties/treaties\\_decisions-hb.php?art\\_id=2](http://ozone.unep.org/new_site/en/Treaties/treaties_decisions-hb.php?art_id=2), last accessed on 3 March 2015).

<sup>14</sup> For example, in the *Trail Smelter* case, see *supra* note 1.

the possibility of its existence<sup>15</sup> and some defined the environmental damage as a special kind of damage<sup>16</sup>. Explicably, the damage in environment was identified in the Security Council Resolution of 8 April 1991, no. 687<sup>17</sup>. Apart from the abovementioned, it is hardly to find provisions of the international law, which refer to environmental damage. As a rule, in the doctrine of the international law and treaty practice, prevailed the concept of the objective state's liability for the environmental damage with transboundary character, which results from the negligence, lack of due diligence, infringement of the contractual arrangements or prohibited activities<sup>18</sup>.

### **Method of environmental damage's calculation**

Unfortunately, neither doctrine nor the practice of international law defines the necessary size of an environmental damage, which would create an international liability. Surely, the damage should be significant<sup>19</sup>, but in each dispute the court have to indicate the level and the scope of the loss.

In the space law, the only reference to the method of the damage calculation was introduced in the Liability Convention. Under article XII of the above mentioned convention *"the compensation which the launching State shall be liable to pay for damage under this Convention shall be determined in accordance with international law and principles of justice and equity, in order provide such reparation in respect of the damage as will restore the person, natural or judicial, State or international organization on whose behalf the claim is presented to the condition which would have existed if the damage had not occurred"*. As it was already said, the definition of the damage from the Liability Convention does not include environmental damage, so the above provision, which regulates the method of the damage calculation, cannot be used in the context of the valuation of the contamination. It can be however used as directions, what is especially important in regard to the restoration of the contamination connected with nuclear or radioisotopic power sources.

### **The scope of the environmental liability in international space law**

At the time of adoption of Liability Convention, the space activities were exclusively conducted by the Soviet Union and the United States. There were virtually no international

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<sup>15</sup> For example, in the *Lac Lanoux* case (see: <http://www.internationalwaterlaw.org/cases/othertribunals.html>, last accessed on 3 March 2015).

<sup>16</sup> For example, in the case concerning certain phosphate lands in Nauru (see: <http://www.icj-cij.org/docket/index.php?sum=413&code=naus&p1=3&p2=3&case=80&k=e2&p3=5>, last accessed on 3 March 2015) or *Gabcikovo-Nagymaros* case (<http://www.icj-cij.org/docket/files/92/7375.pdf>, last accessed on 3 March 2015).

<sup>17</sup> See: <http://www.un.org/Depts/unmovic/documents/687.pdf> (last accessed on 3 March 2015).

<sup>18</sup> M.M. Kenig-Witkowska, *Międzynarodowe prawo ochrony środowiska. Wybrane zagadnienia systemowe*, Warsaw 2011, p. 141-142; See generally: J. Brownlie, *Principles of Public International Law*, Oxford 1990; H. Bocken, D. Ryckbost, *The Codification of Environmental Law*, The Hague 1996; P.W. Birnie, A. E. Boyle, *International Law & the Environment*, Oxford 2002, etc.

<sup>19</sup> For example: in the *Trail Smelter* case, the tribunal said the environmental damage should have "serious consequences" (see: supra note 1), but in the case concerning certain phosphate lands in Nauru the tribunal use the term "irreparable damage" (see: supra note 16).

joint activities in space and the participation of the private companies sounded ridiculous. Today, when most of the space activities are conducted by international companies from private sector, the provisions of space law, in particular Liability Convention, become inadequate to the challenges of privatized and commercialized space activities. In the opinion of some scholars, this creates a loophole in the application of the Liability Convention<sup>20</sup>. Although the provisions of the above-mentioned convention do not apply to the environmental liability in space, it is desirable to build the definition of the launching State in accordance to this document, which in fact has introduced this term. In accordance to art. I of the Liability Convention, a *“launching State means a State which launches or procures the launching of a space object or a state from whose territory of facility a space object is launched”*. Under this broad definition, it is possible to have more than one launching State for each space object. Moreover, the article V of this convention envisages the joint and severally liability, when two or more States jointly launch a space object. Nowadays, when the launch operation is conducted by multinational companies and agencies from private and public sector, this definition makes the international liability in space very problematic.

In the doctrine of the international public law, there is a distinction between the liability of the state and civil liability caused by the actions of the natural person or companies. In practice, some of the international environmental treaties include the obligation for states to use the public funds for the restoration of damages caused by private entities<sup>21</sup>. The international society has been for years discussing the importance of such identification, because of the necessity of quick restoration of the damages. This intent had been firstly expressed in Principle 22 of the Stockholm Declaration<sup>22</sup> and then developed in Principle 13 of the Rio Declaration<sup>23</sup>. Recent international environmental treaties create the civil liability on the basis of the following characteristics:

1. most of them regulate the liability in accordance to the risk acceptance rule, but some of them introduce also the liability based on the fault;
2. they restrict or exclude some types of damages;
3. they oblige the states to create security or insurance fund;

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<sup>20</sup> K. U. Schrogl, C. Davis, *A New Look at the Launching State: The Results of the UNCOPUOS Legal Subcommittee Working Group “review of the Concept of the Launching State*, International Institute of Space Law 2002, vol. 4.

<sup>21</sup> For example: OECD Convention on Third Party Liability in the Field of Nuclear Energy, dated 29 July 1960, see: [https://www.oecd-nea.org/law/nlparis\\_conv.html](https://www.oecd-nea.org/law/nlparis_conv.html) (last accessed 3 March 2015).

<sup>22</sup> „States shall cooperate to develop further the international law regarding liability and compensation for the victims of pollution and other environmental damage caused by activities within the jurisdiction or control of such States to areas beyond their jurisdiction”, see supra note 3.

<sup>23</sup> Principle 13 of the The United Nations Conference on Environment and Development in Rio de Janeiro from 3 to 14 June 1992- „States shall develop national law regarding liability and compensation for the victims of pollution and other environmental damage. States shall also cooperate in an expeditious and more determined manner to develop further international law regarding liability and compensation for adverse effects of environmental damage caused by activities within their jurisdiction or control to areas beyond their jurisdiction”, see: <http://www.unep.org/Documents.Multilingual/Default.asp?documentid=78&articleid=1163> (last accessed 3 March 2015).

4. they authorize the national courts to settle disputes in connection with the damage caused at the territory of this state or national courts of the citizenship state of the polluter;
5. they introduce the polluter pays principle;
6. they introduce the absolute liability for damages caused in connection to activities consider to be particularly hazardous,
7. they create definition of the environmental damage, as a base for future claims,
8. they introduce the environmental liability based on the risk acceptance rule in regard to activities conducted with the special care.

Although these characteristics are undoubtedly useful, their weak side is the determination of the cause and effect link. Moreover, the international practice shows that states are not willing to ratify the treaties, which create the liability system for environmental damage. In my opinion, creating the one, general and common standard, which would regulate the environmental liability on international and space level, is essential for future development of the environmental law. After analyze of the international environmental treaties, it seems that the most effective system is to introduce the term liability in regard to one, special kind of contamination.

It should be also noted that there is also a debate about the international crime liability for environmental damage in the doctrine of international environmental law. The issue was a subject of work of among others: International Law Commission of the United Nations and Council of Europe. However such regulations are mostly criticized. According to its opponents the criminal law is an exclusive right of the state and most of the modern criminal codes contain provisions regarding crimes against environment. On the other hand there are also proponents, which underline the increasing number of environmental crimes and praise its influence on the environmental awareness. In my opinion, the main problem with crime environmental liability is not a number of provisions but their effectiveness. Most of them are silent or poorly applied. In the context of the space law, it is hard however to imagine the criminal liability for the damages.

The other issue, which is important for creation of the environmental liability in outer space mining, is the use of the nuclear power sources. The liability for damage made in connection to nuclear power sources is regulated in the Principles Relevant to the Use of Nuclear Power Sources in Outer Space<sup>24</sup>. However, the provisions of this act have repeated the requirements of the Outer Space Treaty and Liability Convention. In regard to restoration of the damage, this act obliged the launching State to pay a compensation for *“duly substantiated expenses for search, recovery and clean-up operations, including for*

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<sup>24</sup> Principles Relevant to the Use of Nuclear Power Sources in Outer Space, adopted by the General Assembly, opened for signature on 29 March 1972, entered into force on 1 September 1972 (resolution 2777 (XXVI) see: <http://www.unoosa.org/oosa/SpaceLaw/nps.html> (last accessed 3 March 2015)).

*assistance received from this parties*<sup>25</sup>. Under above regulation the duly substantiated expenses are treated as a part of damage, and are the subject of the compensation from the launching State. Unfortunately this provision is incoherent with provisions of the Rescue Agreement<sup>26</sup>. According to the regulations of this agreement, the expenses incurred for the recovery are not the part of damage, and thus the liability for damage and liability for recovery cost are separate. Again, this consideration has only interpretational value, because neither Principles Relevant to the Use of Nuclear Power Sources in Outer Space nor Rescue Agreement is applicable to the issue of the environmental liability.

Finally, it should be also emphasized that doctrinal discussion about space object can also have an influence on the creation of the environmental liability in international space law. Although the definition of the space object can be yet found in the Liability Convention<sup>27</sup>, it is not applicable to the issue of the environmental liability, as it was said above. What is more, the definition from art. I is very narrow and does not cover the reality. Despite of above, creation of the widely accepted definition of space object is very important for environmental law, especially in the light of the liability for damage caused by space debris, which most of the time are the parts or fragments of such objects. The definition, which is discussed above, contains a distinction between component parts and parts. This distinction has practical consequences. In regard to components parts of space object this term covers the small parts and pieces of the main object, which are not able to survive their return on Earth.

## **Conclusion**

Taking all the above into consideration, it should be emphasized that there is no provisions regulating the environmental liability for damages made by commercial companies or states during mining in outer space. Not only because of the fact, that the most of international space agreements were concluded, when the space activities had been conducted exclusively by governmental agencies, but also due to the structure of environmental law, which has been only recently developed. Although over the years the impact of environmental regulations on the international law has increased, its fundamental rules still have no equivalents in space law. Current provisions focus mainly on damages made by the space objects. In my opinion the creation of legal framework in order to prescribe the liability for damages caused to the space environment is essential to develop mining and other commercial activities in outer space. In my point of view, this framework

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<sup>25</sup> Principle 9(3) of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space, see: *supra* note 24.

<sup>26</sup> The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (the "Rescue Agreement"), adopted by the General Assembly. opened for signature on 22 April 1968, entered into force on 3 December 1968 (resolution 2345 (XXII)), see: <http://www.unoosa.org/oosa/SpaceLaw/rescue.html> (last accessed 3 March 2015)

<sup>27</sup> According to its article I *"the term space object includes components parts of a space object as well as its launch vehicle and parts therefore"*.

should be built on the rules developed by the practice and doctrine of the international environmental law.

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