

Legal Challenges in Front of Private Sectors on Exploration of Space Resources and Off-Earth Mining

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Abstract

The task of formulating space law in the 21st century is different from what international community has applied in the past years. Technological and scientific advancement has brought us to the point where mankind will have to consider its next steps in order to enable fair exploitation of Space Resources and Off-Earth Mining. The modern era of globalization requires the more harmonization and unification of the regulation. Outer space activities and related activities have become a part of this global process and the related regulation will have to adopt appropriately. Growing economic uses of space technology and the privatization is leading to the wider applications of private international law which will have to be supported by appropriate provisions on liability. With regard to the development of space technology, the private sector is willing to invest in the exploration of space, but they need that the international community supports their interests against others. Liability of private sector is naturally different from responsibility of states and public sector in space international law. Although the Liability Convention 1972 provides provisions that includes liability regime for states and private sector, there are ambiguities about liability of individuals. There are questions as to whether it protects private sectors against public sector as well as a private sector. In this paper, the authors try to investigate challenges of the legal regime of exploitation on Space Resources and Off-Earth Mining with particular reference to liability for private sector, and show that the current international regime is inadequate for determining liability of private activities in this regard and to indicate how this problem may be settled through private international law.

I. Introduction

Space exploration has been conducted in the names of peace and humanity. The increasing awareness of the value of space exploration and space applications require a new consideration of the merits of international

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competition and international cooperation in space. Exploiting non terrestrial resources pose legal, economic and political issues that the nations must address. Since more than two decades, there are important new developments that may change also the legal order for outer space activities. At least, we can observe a considerable difference to the beginning of the space age when there were only two space powers, the United States of America and the then Soviet Union. The tendency towards commercialization as an orientation towards profit-making and even to privatization and a growing number of users of outer space may ask for new answers and may ask for new legal regulation. Beginning in the 1980s, one could observe a slowly changing number of space users. Not only more governments started to become interested and then active in space activities, but also one can observe a tendency towards commercialization and even privatization.¹ This shall be illustrated by a brief survey of exploration of space resources and off-earth mining.

The difference between then and now is that space activity was once prohibitively expensive, so much so that only sovereign superpowers could entertain such activities. National space agencies served well when the only possible financier was the governments, but now, space activity is far more affordable, and innovative business models can be realistically financed. Simply put, private commercial space enterprise can get the job done just as well as national space agencies, but more efficiently. Private commercial space enterprise also offers a uniquely egalitarian system by which undeveloped nations may benefit from the exploration and use of outer space as much as developed nations.² Private commercial space enterprise has recently demonstrated that it is as capable as and arguably cheaper than national space agencies when it comes to exploring and developing outer space.

The current growing awareness for the possible economic potential of outer space and the celestial bodies may increase chances to arrive at an international legal order for the commercial use of outer space. It is well known that the Outer Space Treaty does not fulfill this task by its provisions of the freedoms of outer space limited because outer space is the province of all mankind. According to the Outer Space Treaty, limitations are the non-appropriation principle, the partial prohibition of military uses and some kind of environmental protection. Limitations from general international law are also framing the freedom of action in outer space. The Moon Agreement

1 Stephan Hobe, *The Impact of New Developments on International Space Law* (new actors, commercialization, privatization, increase in number of “space-faring nations”, etc.), *Unif. Law Rev.* (August-December 2010) 15 (3-4): 870-881.

2 Zach Meyer, *Private Commercialization of Space in an International Regime: A Proposal for a Space District*, *Northwestern Journal of International Law & Business*, Volume 30, Issue 1 *Winter, 2010*.

does not give further guidance as to the exact feature of such an international legal order for economic space activities. The Agreement provides that the Moon and the celestial bodies the common heritage of mankind raises more questions than it answers them. The Moon Agreement also provides that all investing countries may benefit from the Moon resources as well as developing countries should do so. However, it does indicate any concrete criteria for the measuring of the benefits of either side. It is thus completely open whether the international community will or will not eventually decide to engage itself at all in any economic activity on the Moon or other celestial bodies or whether it will do so under very strict restrictions and very severe liability provisions.³

April 24, 2012 marked a milestone in human activities in outer space with the announcement by a group of entrepreneurs, engineers, and investors of the formation of Planetary Resources, Inc. The company's ambitious plan is broken down into three phases. The first phase, which is scheduled to launch in twenty-four months, will deploy Earth-orbiting satellites to identify near-Earth asteroids that have potential resources for harvesting. The second phase involves sending spacecraft beyond earth orbit to provide reconnaissance of near-earth asteroids for potential exploitation of resources including water. Neither of these planned activities falls outside of the norm of the current body of international space law, and except for their commercial nature they are similar to government-sponsored missions. However, the third phase of Planetary Resources' plan leads into uncharted waters and potentially falls outside the current body of space law. The third phase involves deploying unmanned spacecraft to previously identified near-Earth asteroids and begins the process of extracting minerals and other resources for utilization. The question is how this plan fits within the scheme of the current body of space law and how that law will be stretched and modified to meet the challenges thrust upon it.⁴

The Liability Convention 1972 provides provisions that includes liability regime for states and private sector, there are ambiguities about liability of individuals. There are questions as to whether it protects private sectors against public sector as well as a private sector. According to space law launching States are liable in case of an accident of activities of private section into outer space. The launching State bears the risk that a possible recourse against the private enterprise may not be satisfactory because the enterprise is not insured. The only loser of such activity would be the launching State. It is thus in the self-interest of all States potentially involved in the launch of a space object to enact national space legislation which may then require from such private enterprise to adequately insure itself or states through

3 Hobe, 2010.

4 Michael Listner (2012) Asteroid Mining: To Infinity and Beyond, But What are the Legal Implications?, <http://www.spacesafetymagazine.com/author/michael-listner/>.

international community codify regulations in order to separate between liability of states and private section in space activities.⁵ On the other hand, the private sector needs that the international community supports their interests against others. Liability of private sector is naturally different from responsibility of states and public sector in space international law. Therefore survey the challenges of the legal regime of exploitation on Space Resources and Off-Earth Mining with particular reference to liability for private sector is necessary in order to settle main obstacles for space activities of private section to mine and use the resources of the Moon and other celestial bodies.

II. Space Law and Exploration of Space Resources and Off-Earth Mining

The U.N. Committee on the Peaceful Uses of Outer Space (UNCOPUOS) is responsible for the major portion of international space law. It has negotiated five treaties. The first treaty, called the Outer Space Treaty or Principles Treaty, has been ratified or acceded to by almost 100 nations. Its broad principles provide the foundation and the philosophy for activities in outer space—that is, a commitment to explore space in peace and for the benefit of all humanity. The second, 1968 treaty the Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched Into Outer Space—expands on the 1967 principle that astronauts are the “envoys” of humanity who should be honored and assisted in every respect. The 1973 Convention on International Liability for Damage Caused by Space Objects spells out many of the liabilities and duties of spacefarers and describes a procedure to enforce these obligations. The 1976 Convention on the Registration of Objects Launched Into Outer Space, expands on the 1967 principle that nations retain jurisdiction over and responsibility for their facilities and objects in space. The 1979 Moon Treaty builds on another 1967 principle, space for the benefit of mankind, to dictate an international regime that will be established at a future date to regulate space resources “in place,” declared now the “common heritage of mankind”. The treaty does represent the most complete international effort to date to deal with the legal and public questions of colonizing and exploiting space.

Because of the extremely high costs involved in building and successfully launching objects into space, extracting resources has become a high-profile potential activity, as it gives the possibility of reaping a return on investment and ultimately lowering the costs of activities in space. However, in addition to the technological hurdles that must be overcome, there are multiple legal issues that must be resolved.⁶ There are a number of legal issues emerging

⁵ Hobe, 2010.

⁶ David Liechty, (2015) Human Activities in Space: Issues and Framework of the United States Law Concerning Outer Space, <http://www.globalresearch.ca/issuesandframeworkoftheunitedstateslawconcerningouterspace/5484590>.

regarding Exploration of Space Resources and Off-Earth Mining. The utilization of space resources will raise many legal issues that it should be considered. The most important legal issue for natural resource exploitation is the issue of property rights and the ability of private commercial actors to own resources in outer space. As indicated above, the 1967 Outer Space Treaty expressly states that countries may not appropriate “outer space, including the Moon and other celestial bodies ... by any ... means.” Thus, this article concentrates only issue of property rights and non terrestrial mining and issue of legal liability and responsibility.

According to the present space law, all mining in space-lunar, asteroids, or planetary-is treated alike. The operative treaty provisions are (1) that space is reserved for the benefit and is the province of all mankind; (2) that every nation shall have equal access to outer space; (3) that nations cannot appropriate space under any claim of national sovereignty; (4) nevertheless, that nations are free to explore and “use” outer space. However, according to the 1967 Outer Space Treaty, space is to be used for “the benefit of mankind” and Nations cannot annex or appropriate outer space or the celestial bodies.

Extraction of extraterrestrial resources is not prohibited per se by the Outer Space Treaty; however, to the extent that extraction implicates a property interest, such an activity could be prohibited. The pertinent part of the Outer Space Treaty dealing with property rights is the prohibition on nations appropriating outer space and extraterrestrial bodies such as the Moon and asteroids as their sovereign territory. While there is no disagreement about sovereign nations claiming property rights in outer space, whether private individuals, including legal entities can make claims and appropriate these bodies and the resources within is up for debate. The crux of the debate is whether an exception that allows private ownership exists within the Outer Space Treaty. This question is a matter of continuing debate with one side claiming that no such exception exists and the other claiming that it does. Until now, the debate has been abstract and both sides have proffered arguments supporting their positions. However, with the potential of actual resource extraction occurring within the decade, the stakes are substantially higher than winning an academic debate. If the actual resource extraction by the private entities be illegal under international law and states bear responsibility and liability by their activities, thus states should not allow the private section invests billions of dollars to perform extraction missions on near-Earth asteroids. For example, if the status of private property rights is not settled, the United States government may be faced with the choice of either halting Planetary Resources’ extraction activities or facing the possibly that it may be sanctioning an activity that could be illegal under international law and the resultant diplomatic and political fallout.

Essentially, there are two approaches in this regard.

1. Some developed countries especially the United States believe that all nations can mine and claim resources “in place” even under the 1979 Moon Treaty. The official position of the United States clearly enunciated in the debates of UNCOPUOS, interprets these provisions to permit any nation or corporation to mine and otherwise use the resources of outer space. The treaty language prohibiting ownership of space resources “in place” means that when the resources have been removed from “in place,” personal labor attaches and the mining concern would own the extracted materials. The treaty also envisions that the signatory nations would “undertake” to establish an international regime when utilization of space resources becomes an active possibility. By analogy to the international regime described in the Law of the Sea Treaty (which transfers technology and proceeds from the resource developer to nonparticipants), the regime for space has been vilified, and this was a major issue in the defeat of the treaty. The interpretations of the U.S. negotiators evoke alternative regimes, including an international investment organization which nations could join if they desired. Intelsat, the International Telecommunications Satellite Consortium, is such a model.

There is debate as to the applicability of this provision to private commercial actors, but the United States believe that under the current space law regime outer space is not subject to appropriation by nongovernmental actors. This interpretation has found support in a U.S. Department of State letter to a private U.S. commercial enterprise claiming ownership of an asteroid (in which the Department of State representative indicated that “private ownership of an asteroid is precluded by Article II of the 1967 Outer Space Treaty.) and in a U.S. District Court ruling that the 1967 Outer Space Treaty prohibits private appropriations in outer space.

2. Some developing countries believe that states including their private entities cannot mine the Moon and other celestial bodies. The Moon Treaty not only deals with the Moon, but also planets and asteroids, which makes it a potential player in the planned extraction activities. The precepts of the Moon Treaty directly prohibit private ownership, thus addressing the contentious issue left open by its parent. It also addresses resource extraction by approaching it from the point of view of wealth distribution amongst the nations of the Earth, thus subordinating profit. The Moon Treaty goes further by mandating the creation of a yet-to-be defined international legal regime to oversee the extraction and distribution of extraterrestrial resources. It is this legal regime, which is similar to one found in the original draft of the Law of the Sea Convention, that has proven to be controversial to the major space faring nations.

However, with the likelihood of resource extraction becoming a reality, the Moon Treaty may find new vigor with non-parties joining the accord and adding new voices in the chorus to make its effect as international law more pronounced. Even more so, countries such as the Russian Federation and the People's Republic of China, which both refused to become part of the Moon Treaty when originally opened for signing, may decide to throw their support behind the accord instead of facing the risk of being left behind in resource extraction activities. Such support could provide sufficient political and soft-power pressure such that the United States may be forced to stall Planetary Resources' activities until such time as it could negotiate an annex to the Moon Treaty as has been done with the Law of the Sea Convention. The effect would be to effectively stall extraction activities until the legal issues could be resolved. As the capabilities for actually mining asteroids, the moon, and other planets further develops, however, pressure will only build for individual countries and the international community as a whole to clarify this issue and develop appropriate regulations. The 1984 UN Moon Agreement, which reasserts the common heritage of mankind in using outer space, also asserts that an international regime needs to be put in place to govern and ensure equitable distribution of the benefits of resource extraction. However, since the Moon Agreement is viewed as being an empty agreement and not in force, this provision is no more than a non-binding statement of principle. Some legal experts believe States signatory to the 1967 Outer Space Treaty could opt for national legislation that interprets it as allowing private commercial ownership of resources in outer space, and the United States Congress has introduced a number of bills which appear to follow this interpretation. However, even if such legislation was carefully drafted, it would most certainly go against international opinion and could have significant geopolitical consequences. Disregarding or appearing to disregard the 1967 Outer Space Treaty could possibly disrupt the current space law regime and lead to significant additional challenges and tensions, especially with the promised benefits of mining in outer space at stake.⁷ Another issue is that a nation cannot appropriate a celestial body, it can use the resources. If space mining basically consumes an entire, small near-Earth asteroid, has the "use," become an "appropriation" of the celestial body? This situation appears to be example in which the technologies have rendered the treaties obsolete. Perhaps, representatives of the states in the COPUOS should be amended the treaties in order to redefine these smaller asteroids as a different class of celestial bodies. However, if we accept that all nations can mine and claim resources "in place" Of course, it will need to make a international regulation to protect

7 Joanne Irene Gabrynowicz, *One Half Century and Counting: The Evolution of U.S. National Space Law and Three Long-Term Emerging Issues*, 4 *Harv. L. & Pol. Rev.* 405, 406 (2010) (available at <http://joannegabrynowicz.com/wp-content/uploads/2013/11/2010-Gabrynowicz-HLPR-4.2-405-426-US-Space-Law.pdf>).

private activities and in this way separate between states liability and individual liability by private section.

III. Liability

According to the 1967 Treaty, nations are responsible for the space activities of their nationals.⁸ The Liability Convention in 1973, moreover, established an absolute liability for damages on Earth caused by space activities. Liability based on fault is authorized for damage in space.⁹ Therefore, if any country decide to take in private industry as a partner in transporting or mining, they would have to monitor these partners closely. The Liability Convention also provides that nations are jointly and severally liable for damages caused by their cooperative space effort.¹⁰ Although the memorandums of understanding or treaties among these national partners will apportion liability and provide a mechanism for settling disputes, the bottom line remains that one nation may be held liable for the entire accident.

Another legal concern surrounds liability for any incidents arising out of private entities activities. The Liability Convention has stood as a sentinel protecting the interests of other nations for damage caused by space activities both on the surface of the Earth and in outer space. However, the effectiveness of the Liability Convention is questionable. The first time the Liability Convention was invoked during the Cosmos 954 incident in 1979, it resulted in an agreement that, while based on the duties and obligations of the former Soviet Union under both the Rescue Agreement and the Liability Convention, has been criticized since the former Soviet Union never fully compensated the Canadian government for the amount agreed to. The concern is that if private entities activities cause appreciable damage on the surface of the Earth, will the Liability Convention's precepts be sufficient to ensure fair and just compensation? The question of effectiveness also applies to incidents that may occur in outer space as a result of Planetary Resources' activities. This second scenario, outlined in Article III of the Liability Convention, has yet to be tested. The incident between Cosmos 2251 and Iridium 33, which could have implicated this scenario of the Liability Convention, failed to trigger because there was insufficient evidence to determine which party was at fault and to what extent the parties were at fault. With Planetary Resources' activities likely to increase the amount of traffic in both medium and low Earth orbit, the potential for accidents to occur will increase. The question is whether the Liability Convention as it stands today is sufficient to address the potential incidents that could be caused by this activity. Notably, the Liability Convention implicates

8 Article IV of the 1967 Outer Space Treaty.

9 Article XI of the 1967 Outer Space Treaty.

10 Article IV of the 1973 Liability Convention.

government responsibility for the activities of those operating under its jurisdiction and for any damages that may occur as a result. It is common practice for a launching State to require an entity performing outer space activities under its jurisdiction to provide indemnification for any damage that the government may have to pay compensation for. However, with the magnitude and scope of activities planned by Planetary Resources, the question is what is the proper amount of surety to post in the event that an accident occurs? This also begs the question that given the potential wealth that these mining operations will generate, should the amount of compensation made available to an aggrieved party go beyond what a government will offer as fair compensation?

The following issues to international space law liability represent serious challenges:

1. Applicable criteria under Article VII of the Liability Convention are that the State which launches or procures the launching of an object into outer space is liable. One of these challenges is the question as to whether international liability applies at all in the case where a private entity launches an object into outer space. Unlike the Article VI, no mention is made in Article VII as to non-governmental entities, therefore, placing in question whether the activity of a private entity, which in fact launched or contracted for the launch could result in liability of its State. The consequence of a negative answer to this question might be that States do not provide in their domestic legislation for any recourse against the private entity in such a situation.¹¹
2. The launching State is absolutely liable and is liable in different degrees of fault, but in final consequence the State is liable for damage caused by a private enterprise. This certainly affects space tourism. It is imaginable that States refuse to allow private enterprises to perform space tourism, or that States set up exaggerated requirements just because of the above mentioned state-liability. This could lead to some kind of forum-shopping towards launching States that either cannot or do not want to grant sufficient control over space activities, or that – in case of damage – would not pay compensation anyway, because of the lack of legal tools for enforcement. Therefore, unlimited liability of States practically according to the Liability Convention is cut by international agreements that stipulate a limited but guaranteed maximum-amount-liability for space tourism.¹²

11 C.Q. Christol, *The Modern International Law of Outer Space*, Pergamon Press, 1982, pp. 39-42.

12 Gimblett, R, *Space Insurance into the Next Millennium*, in: *Outlook on space law over the next 30 years*, Kluwer 1997, p. 163.

The authors are of the opinion that it is better for international community to provide a new treaty on private international space law by modeling the Intergovernmental Agreements (IGA) and private international air law which could complete the shortages of the Liability Convention. The Intergovernmental Agreement (IGA) have been established during a phase of the Station program when the partner States were concentrating on the various aspects to be included within the development of the program itself. The dispositions on the various stages of development are detailed and clear, whereas those directly linked to usage operations are vaguer and therefore require a greater interpretation effort in the event of application to concrete events.

The will to establish a common legal regime on specific questions, seems to be the direction suggested by the doctrine and practice of partner States for future developments of the legal framework of new liability regime. The agencies are required not only to regulate the conduct of the astronauts according to their own specific personnel policies, in accordance with the IGA, but also according to the rules of the code which the astronauts are required to understand and accept. Crew members are required to conform to the dispositions indicated in the code, the application of which is in force the moment they are assigned to a specific mission, lasting until post-flight activities are completed. The IGA establishes that each State maintains jurisdiction and control over its personnel, it has been necessary to involve the States in the decision and internal application of the code rules.

The risk allocation regime established under the International Space Station Agreement constitutes an exception to the liability regime in the Liability Convention; however, it can be used in new treaty. The Liability Convention allows the possibility of arrangements between launching States to distribute the risks arising from a joint launch. The risk allocation regime, however, may not impair the right of a non participant State sustaining damage to seek the entire compensation due from any or all of the launching States. It is thus submitted that the risk distribution regime of the International Space Station agreement qualifies as an agreement among launching States to redistribute their financial obligations in terms of article V of the Liability Convention. The risk allocation regime is valid only among these States. Furthermore, article XXIII of the Liability Convention supports this conclusion, as it further prescribes that the Liability Convention has no effect on other treaties so far as relations between parties are concerned and that States can enter into treaties reaffirming, supplementing or extending its provisions, provided, however, that this regime do not affect the rights of the victims.¹³

Therefore, there is a need for an International Convention in liability for private space. The States can broaden the limited liability regime, to space law, in order to overcome the problem of the lack of responsibility.

13 Julian Hermida, *International Space Law*, Kluwer Academic Publishers, 2004, p. 27.

IV. Conclusion

Commercial participation in the space industry has recast the Space Race, once a public and national endeavor, as a private and commercial endeavor. Private commercial space enterprise is poised to cheaply, and ostensibly fairly, exploit many natural resources of outer space. Such exploitation is desirable because of the potential benefits exploitation would have for science, industry, commerce, and society. But international law does not encourage private commercial space enterprise to exploit outer space. However, international law does not prohibit exploitation. Instead, international law requires an international regime to be established to govern the process of exploitation, particularly to oversee the “equitable sharing” of the benefits. Other commentators have suggested major revision or abandonment of international law. But this would undermine international law, an unnecessary and undesirable result. Instead, an international regime can and should be established. A space district could potentially resolve many of the important problems confronting the establishment of such a regime.

The approach of international space law needs to be deeply reconsidered and re-defined to enable private enterprises to (directly) perform outer space activities. Otherwise space activities will have to be performed by private enterprises under the regime of States, which provokes conflicts that can be avoided. There arise in the future concrete factual situations that make desirable or even necessitate consideration of one or more specific amendments to the space treaties. However, consideration of such amendment(s) should not take place in the abstract. It is up to these States to decide how to abide by their international obligation of authorization and continuing supervision. In cases where their non-governmental nationals conduct such activities and whether in the event of damage caused by the latter, the State wishes to apportion all or a part of such liability to such actors.

