sion, in line with the philosophy of the new government, would have been to introduce obligatory measures for aircraft operators like the one of the EU.[100] Such measures would have shown the leadership of Korea in the universal issue of environment that it is at least morally indebted to from the time it joined the OECD.

[100] While the data on the emissions of each airliner in the world is not made public, it seems that the two Korean airliners seem to be in the first group of efficiency on the list.

THE MOON AGREEMENT IN THE 21ST CENTURY: ADDRESSING ITS POTENTIAL ROLE IN THE ERA OF COMMERCIAL EXPLOITATION OF THE NATURAL RESOURCES OF THE MOON AND OTHER CELESTIAL BODIES

*Fabio Tronchetti**

I. INTRODUCTION

The beginning of the 21st century has been characterized by a renewed interest of States and private operators in the exploration of the Moon and, possibly, in the exploitation of its natural resources. In recent years, the major space powers, including the United States,[1] China,[2] India,[3] and Japan[4] have

* Associate Professor of Law/Associate Director of the Space Law Research Institute, School of Law, Harbin Institute of Technology, People's Republic of China. fabio.tronchetti@yahoo.com.

[1] On June 18, 2009, the United States launched the Lunar Reconnaissance Orbiter (LRO) mission, the main purpose of which is to study the physical composition of the Moon by focusing particular attention on the Polar Regions. *See Lunar Reconnaissance Orbiter*, http://lunar.gsfc.nasa.gov/mission.html (last visited Oct. 27, 2010). The LRO mission would have represented the first step in the realization of the Vision for Future Space Exploration, which was proposed by former US President George W. Bush in 2004. NAT'L AERONAUTICS & SPACE ADMIN., NP-2004-01-334-HQ, THE VISION FOR SPACE EXPLORATION iii-iv (2004), *available at* http://www.nasa.gov/pdf/55583main_vision_space_exploration2.pdf. The Vision foresaw the return of astronauts on the Moon by 2020, the establishment of a permanent manned basis on the lunar surface and the use of the Moon as a basis for future space exploration. *Id*. In order to pursue the goals laid down in the Vision for Space Exploration, the United States developed the Constellation Program, which is aimed, inter alia, to build new spacecraft and booster vehicles to replace the Space Shuttle and to send astronauts back to the Moon and possibly to Mars. *See* Benjamin D. Hatch, *Dividing the Pie in the Sky: The Need for a New Lunar Resources Regime*, 24 EMORY INT'L L. REV. 229, 237-38 (2010). *See generally NASA – Constellation Main*, http://www.nasa.gov/mission_pages/constellation/main/index.html (last visited Nov. 1, 2010). Currently, however, the United States seems to have renounced these objectives. The fiscal budget allocated to NASA for the year 2011, indeed, reveals that the Obama's administration has decided to cancel the Constellation program. *See* The White House, Office of Management and Budget, National Aeronautics and Space Administration, *The Federal Budget Fiscal Year 2011*, http://www.whitehouse.gov/omb/factsheet_department_nasa/ (last visited Feb. 4, 2011),

launched robotic missions with the purpose of mapping the mineral composition of the Moon and locating the most suitable landing site for a potential return of men on the lunar surface.

Returning to the Moon is, thus, no longer a priority for the United States; instead, sending astronauts to an asteroid and then to Mars appears to be the new goals of the American space exploration program. *See* Tariq Malik, *Obama Aims to Send Astronauts to an Asteroid, Then to Mars*, Apr. 15, 2010, http://www.space.com/8222-obama-aims-send-astronauts-asteroid-mars.html.

[2] China is also very active in the field of the research and analysis of lunar resources. China's Moon exploration program consists of the following objectives: 1) analysis of the Moon's composition by satellite, Luan Enjie, *The Chang'e-1 -- Project China's Lunar Exploration Program (II)*, THE LEADING GROUP OF LUNAR ORBITING EXPLORATION PROJECT, http://www.clep.org.cn/index.asp?modelname=eng\en-news_nr&FractionNo=&titleno=News&recno=6 (last visited Oct. 27, 2010); 2) deployment of two moon rovers for surface exploration in a limited area by 2013; 3) a sample return mission by 2017, *China's Recoverable Moon Rover Expected in 2017*, CHINA DAILY, Mar. 11, 2008, http://www.chinadailycom.cn/china/2008-03/11/content_6527471.htm; 4) a manned mission by 2025-2030, SpaceDaily.com, China's Space Programme Gears Up for Missions to Moon and Mars, http://www.spacedaily.com/reports/China_Space_Programme_Gears_Up_For_Missions_To_Moon_And_Mars_999.html (last visited Nov. 1, 2010). On October 24, 2007, the first spacecraft of the programme *Chang'e*, namely *Change-1*, was launched. The purpose of *Change-1* was to study the composition and quality of the lunar resources. Change-1 mission ended in November 2009 (crashed into the Moon in March 2009, *see China's lunar probe Chang'e-1 impacts moon*, Mar. 1, 2009, http://news.xinhuanet.com/english/2009-03/01/content_10923205.htm). On October 1, 2010, China launched its second lunar robotic mission, *Chang-e 2*. *See* Paul Nash, *Lunar Dreams Inspire Tomorrow's Generation of Scientists*, GLOBAL TIMES, Oct. 11, 2010, http://opinion.globaltimes.cn/foreign-view/2010-10/580601.html.

[3] India launched its first mission to the Moon, *Chandrayaan-1*, on 22 October 2008. *Mission Sequence*, INDIAN SPACE RESEARCH ORG., http://www.isro.org/Chandrayaan/htmls/mission_sequence.htm (last visited Oct. 27, 2010). The mission was aimed at mapping the entire lunar surface, both on the near and far side, in order to get a better knowledge of the minerals contained on the Moon and to facilitate the future presence of human beings on its surface. Narendra Bhandari, *Chandrayaan-1: Science Goals*, 114 J. EARTH. SYST. SCI. 203-204 (2005), *available at* http://www.ias.ac.in/jessci/dec2005/ilc-14.pdf. The mission ended prematurely on 29 August 2009, fourteen months before its expected end, due to an abrupt malfunctioning. *ISRO's Mission Over?*, THE TIMES OF INDIA, Aug. 29, 2009, http://www.timesnow.tv/ISROs-moon-mission-over/articleshow/4325977.cms. The second Indian lunar mission, *Chandrayaan-2*, is scheduled to take place by =2013. *Chandrayaan-2 to Get Closer to Moon*, THE TIMES OF INDIA, Sept. 2, 2010, http://timesofindia.indiatimes.com/india/Chandrayaan-2-to-get-closer-to-moon/articleshow/6477808.cms. The main goal of this mission will be to land a motorized rover on the lunar surface so as to pick up samples of soils and rocks, carry out on-site chemical analysis, and send the data back to the mother spacecraft *Chandrayaan-2*, which will then transmit the data to Earth. *Id*.

[4] On 14 September 2007 Japan launched the *Selene* mission whose purpose was to analyze the Moon's history and its physical composition. *See SELenological and Engineering Explorer "KAYUGA" (SELENE)*, JAPANESE AEROSPACE EXPLORATION AGENCY, http://www.jaxa.jp/projects/sat/selene/index_e.html (last visited Nov. 3, 2010).

In this respect, China[5] and India[6] are the only two States officially pursuing the goal of sending a manned mission to the Moon in a period ranging from 2020 and 2030, while the United States seems to have renounced such a goal.[7]

This global interest in the Moon and its natural resources has opened the debate on the ability of the current space law regime to ensure the orderly and safe development of future lunar activities, particularly those aimed at exploiting the natural resources of the Moon and other celestial bodies for commercial purposes. In this respect, particular attention has to be paid to the Moon Agreement,[8] as it represents the only existing legal instrument specifically dealing with the exploration, use, and exploitation of the Moon and its natural resources.

Currently, only thirteen States, not including the spacefaring States, have ratified the Agreement.[9] While it can be reasonably argued that the very low number of ratifications is attributable to some factors external to the Agreement, such as the lack of interest of the United States and Soviet Union in carrying on with the exploration of the Moon in the 1980s and 1990s and the budgetary limits faced by State space agencies forcing them to invest resources in activities able to generate certain and immediate financial benefits (e.g., the development of telecommunication satellites), the main reason behind the failure of the Agreement is to be found in the provisions of Article 11. That Article declares the Moon and its natural resources to be the "common heritage of mankind."[10] Developed and developing States held different interpretations of this concept and

---

[5] *China Considering Manned Lunar Landing in 2025-2030*, CHINA VIEW, May 24, 2009, http://news.xinhuanet.com/english/2009-05/24/content_11425131.htm.

[6] According to official statements, India intends to spend spend £1.7bn to send man to the moon. In this regard, senior official of the Indian Space Agency (ISRO) have announced that India plans to launch its first manned mission by 2015 and its first lunar manned mission by 2020. *See* Dean Nelson, *India to spend £1.7bn sending man to the moon*, Feb. 23, 2009, http://www.telegraph.co.uk/news/worldnews/asia/india/4788143/India-to-spend-1.7bn-sending-man-to-the-moon.html.

[7] *See supra* note 1.

[8] Agreement Governing the Activities of States on the Moon and other Celestial Bodies, Dec. 5, 1979, 1363 U.N.T.S. 3, 18 I.L.M. 1434 [hereinafter Moon Agreement].

[9] *Id.*

[10] Moon Agreement, *supra* note 8, at art. 11.

its legal consequences. Due to the hopelessness of reaching a common position on this issue, the space-faring States and the majority of developing countries decided not to become Parties to the Moon Agreement.[11]

Taking into consideration the renewed interest in the Moon and the reluctance of States to accept the Moon Agreement, two questions arise: 1) Is the Moon Agreement the proper instrument to regulate present and, in particular, future explorative and exploitative lunar activities? and 2) Do we need a new instrument? In short, is it still reasonable to insist on an Agreement which has been refused by the majority of the States or is it time to propose a new legal mechanism for governing operations on the Moon either in the form of an amendment to the Agreement or a new treaty?

The present paper supports the second hypothesis. Due to the refusal of States to ratify the Agreement, and the fact that none of the space-faring States has expressed the intention of ratification in the near future, the development of a new instrument setting forth a legal regime to regulate lunar activities, especially those aimed at exploiting the natural resources of the Moon for commercial reasons, is needed.

The need for such a legal regime also stems from the fact that, when the provisions of the Moon Agreement are inapplicable, the existing space law regime does not offer a clear set of rules regulating how this exploitation should be carried out. The only somewhat relevant instrument in this respect is the 1967 Outer Space Treaty,[12] which however, is not able to fill this gap alone. The absence of specific rules clearly discourages private operators as well as developed States from investing in the exploitation of extraterrestrial resources, because there is no legal certainty that such exploitation may generate any profit.[13]

---

[11] FABIO TRONCHETTI, THE EXPLORATION OF NATURAL RESOURCES OF THE MOON AND OTHER CELESTIAL BODIES 57-61 (2009).

[12] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, *opened for signature* Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty].

[13] In this respect, one of the main problems is the uncertainty relating to the acquisition of property rights over the extracted resources and the benefits derived from their commercial use.

After an analysis of the natural resources present in the Moon and other celestial bodies, the paper will address the legal status of the Moon by comparing the Outer Space Treaty and the Moon Agreement. The failure of the Moon Agreement and the major limitations and negative impacts of its provisions on commercial activities on the Moon will then be examined. The last part of the paper will outline the essential elements to be inserted into the new legal regime aimed at regulating the exploitation of the natural resources of the Moon and other celestial bodies.

II. THE NATURAL RESOURCES OF THE MOON AND OTHER CELESTIAL BODIES

Before analyzing the legal status of the Moon, it is important to understand why States and private companies are so interested in reaching the Moon and other celestial bodies. The main reason is the possibility of mining the natural resources located in the lunar and other celestial bodies' soil and of using them for commercial purposes.

> The Moon is rich in mineral resources
>
> distributed uniformly across its surface and subsurface. It has been demonstrated that the Moon is rich in aluminum, iron, silicon, oxygen, hydrogen, chromium, manganese, potassium, and other minerals. These minerals can be utilized in their original form or refined into structural and electrical materials. They can be either brought back to Earth or used for life support of a permanent lunar basis or as rocket propellant. For instance, oxygen and hydrogen are contained in the lunar regolith at all latitudes. Oxide minerals such as limonite or olivine can be removed as water vapor by warming up these minerals with hydrogen. The water vapor which is obtained can be condensed and electrolyzed into hydrogen,

> and the oxygen is liquefied. These components can be used as life support or propellant for rockets.[14]

Additionally, a very recent NASA mission, the Lunar Crater Observation and Sensing Satellite (LCROSS) mission, has confirmed the presence of water-ice at the south pole of the Moon.[15] It is still not well-known how vast this amount is. However, in case of presence of a large amount of water, this could have a huge positive impact, because it could support the life of astronauts on the Moon's surface.

Notably,

> [t]he most valuable resource contained on the Moon is Helium-3. Helium-3 may be considered the main reason behind the interest that States and private operators are showing with respect to the Moon and to the exploitation of its resources. Helium-3 is an isotope, scarcely present on Earth but abundant on the Moon, which combined with other materials, such as deuterium, can be used as fuel in fusion power reactors. The value of Helium-3 is that it can generate nuclear power and, as a consequence, energy in a clean way, namely through a process of nuclear fusion which does not produce toxic waste.

---

[14] FABIO TRONCHETTI, *supra* note 11, at 5.

[15] The Lunar Crater Observation and Sensing Satellite (LCROSS) mission was carried out by NASA to demonstrate the existence of water at the lunar poles. Mike Wall, *Moon Crater Has More Water than Parts of Earth*, LiveScience.COM, Oct. 21, 2010, http://www.livescience.com/space/moon-cabeus-crater-water-101021.html. The mission consisted of a rocket and a probe smashing into a lunar crater, the Cabeus crater, on 9 October 2009. *Id*. This impact was supposed to generate a plume of debris visible on Earth by means of spectral analysis which could confirm the presence of water ice. *Id*. Although the debris cloud provided the evidence scientists were looking for. *Id*. In addition, the work of the probe, which followed the rocket into the lunar crater, proved to be highly successful. *Id*. It detected vast amounts of water-ice and water vapour. *Id*. The results of the LCROSS mission provided confirmation for the data obtained by the Indian's *Chandrayaan-1* and NASA's *Cassini* and Deep Impact missions, which had already indicated the presence of water on the Moon. *See It's Official: Water Found on the Moon*, NASA LUNAR SCIENCE INSTITUTE, http://lunarscience.arc.nasa.gov/articles/its-official-water-found-on-the-moon (last visited Nov. 3, 2010). Information about the *Cassini* and Deep Impact missions is available, respectively, at http://www.nasa.gov/mission_pages/cassini/main/index.html; and http:/www.nasa.gov/mission_pages/deepimpact/main/.

> Thanks to these special characteristics the extraction of Helium-3 is likely to have a huge impact on the way energy is produced and distributed on Earth. Helium-3, indeed, has the potential to replace fossil fuels and other substances as primary source of energy on Earth. It has been estimated that twenty-five tonnes of Helium-3 can provide all the power that the United States needs in a year.[16]

The celestial bodies other than the Moon are rich in natural resources too.[17] This is particularly true with regard to the estimated 1400 near Earth asteroids which cross the Earth's orbit around the Sun.[18] These asteroids, which are easily accessible from the Moon, are in many cases dead comets, containing huge amounts of iron as well as water.[19] "Also the two Martian moons, Phobos and Demos, contain significant quantities of minerals."[20]

III. THE LEGAL STATUS OF THE MOON: FROM THE OUTER SPACE TREATY TO THE MOON AGREEMENT

The legal status of the Moon is defined by the Outer Space Treaty and the Moon Agreement. The study of the Moon Agreement cannot be carried out without making appropriate references to the Outer Space Treaty,[21] as the former re-affirms and further elaborates certain provisions of the latter.

Article I and II of the Outer Space Treaty are of special importance for any legal analysis of the Moon, as they confer on

---

[16] TRONCHETTI, *supra* note 14, at 5-6. *See* David Whitehouse, *Moon Map Aids Discovery*, BBC NEWS, Dec. 2, 1998, http://news.bbc.co.uk/2/hi/sci/tech/226053.stm.

[17] TRONCHETTI, *supra* note 14, at 6.

[18] *Id.*

[19] *Id.*

[20] *Id.*

[21] For a broad analysis of the provisions of the Outer Space Treaty, see CARL Q. CHRISTOL, THE MODERN INTERNATIONAL LAW OF OUTER SPACE 21 (1982); BIN CHENG, STUDIES IN INTERNATIONAL SPACE LAW 215 (1997); M.N. ANDEM, INTERNATIONAL LEGAL PROBLEMS IN THE PEACEFUL EXPLORATION AND USE OF OUTER SPACE 30 (1992); I.H. PH. DIEDERIKIS-VERSCHOOR & V. KOPAL, AN INTRODUCTION TO SPACE LAW 24-31 (3d rev. ed. 2008); Paul G. Dembling & Daniel M. Arons, *The Evolution of the Outer Space Treaty*, 33 J. AIR L. & COM. 419 (1967); He Qizhi, *The Outer Space Treaty in Perspective*, *in* PROCEEDINGS OF THE FORTIETH COLLOQUIUM ON THE LAW OF OUTER SPACE 52 (Am. Inst. of Aeronautics & Astronautics ed., 1997).

outer space, including the Moon and other celestial bodies, the status of *res communis omnium*.[22]

When space activities began in the late 1950's, the international community started debates on the legal status to be attributed to outer space. Two diverging proposals were put forward. The first suggested considering outer space a *res nullius,*[23] namely an area which is not under the sovereignty of any State and hence susceptible of being occupied and acquired by States.[24] The second proposed to define outer space as a *res communis omnium* that is an area not capable of being appropriated by any State and open for free exploration and use.[25] The second proposal gained wide support and was, thus, accepted and agreed upon by States. The renouncement of any territorial claims over outer space was considered by States as the best

---

[22] The concept of *res communis omnium* is described in IAN BROWNLIE, PRINCIPLES OF PUBLIC INTERNATIONAL LAW 105, 169 (7th ed. 2008); MALCOLM N. SHAW, INTERNATIONAL LAW 492, 544-45 (6th ed., Cambridge Univ. Press 2008); & Nagendra Singh, *Introduction to International Law of the Sea and International Space Law*, *in* INTERNATIONAL LAW: ACHIEVEMENTS AND PROSPECTS 825, 883 (M. Bedjaoui ed., 1991).

[23] *See* BROWNLIE, *supra* note 22, at 147; SHAW, *supra* note 22, at 423-26, 432-38.

[24] Among the authors who proposed to consider outer space as a *res nullius* there were, for instance, A. Haley, *Space Law – The Development of Jurisdictional Concepts*, *in* PROCEEDINGS OF THE EIGHTH INTERNATIONAL ASTRONAUTICAL CONGRESS 170 (Am. Inst. of Aeronautics & Astronautics ed., 1958).; J. Verplaetse, *Can Individual Nations Obtain Sovereignty over Celestial Bodies?*, *in* PROCEEDINGS OF THE THIRD COLLOQUIUM ON THE LAW OF OUTER SPACE 311 (Am. Inst. of Aeronautics & Astronautics ed., 1961).

[25] The *res communis omnium* character of outer space was held, for instance, by J.E. Faria, *Draft to an International Covenant for Outer Space: The Treaty of Antarctica as a Prototype*, *in* PROCEEDINGS OF THE THIRD COLLOQUIUM ON THE LAW OF OUTER SPACE 122 (Am. Inst. of Aeronautics & Astronautics ed., 1960); Kenneth B. Keating, *The Law and the Conquest of Space*, 25 J. AIR L. & COM. 182, 189 (1958); Eugene Pepin, *Introduction to Space Law*, 4 N.Y.L.F. 258, 258-62 (1958); Michel Smirnoff *Problem of Legal Status of Celestial Bodies*, 28 J. AIR L. & COM. 385 (1961-62); Y. Korovin, *Conquest of Outer Space and Some Problems of International Relations*, 5 INTERNATIONAL AFFAIRS 88, 90 (1959); *Air Sovereignty and the Legal Status of Outer Space*, 49 INT'L L. ASS'N REP. CONF. 245-46 (1960) (comments of Professor Dr. D. Goedhuis); Id. at 246-48 (Comments of Professor A. Meyer). It is also possible to confer on outer space the status of *terra communis* as distinguished by that of *terra nullius*. These two concepts specifically refer to a territory. The latter refers to a territory which belongs to no one and can be appropriated; the former indicates a territory incapable of ownership and control and freely open for exploration and use**.** Frans G. von der Dunk, *The Dark Side of the Moon. The Status of the Moon: Public Concepts and Private Enterprises*, *in* PROCEEDINGS OF THE FORTIETH COLLOQUIUM ON THE LAW OF OUTER SPACE (Am. Inst. of Aeronautics & Astronautics ed., 1997) [hereinafter *The Dark Side of the Moon*].

guarantee for preserving the peaceful nature of the space environment and for ensuring that the space era could represent an opportunity of development for all humankind.

Article II of the Outer Space Treaty reflects this idea by declaring that "[o]uter space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means."[26] Article II, thus, clearly affirms that States cannot extend their territorial sovereignty over outer space or any of its parts. Obviously, this prohibition also applies to the Moon, being part of outer space.

The provisions of Article II must be read in conjunction with those of Article I, which establishes the principle of freedom of exploration and use of outer space, without discrimination of any kind, as well as the freedom of access to all areas of celestial bodies. To sum up, this means that States can freely explore and use the space environment as long as they do not prevent others from doing the same.[27]

A key issue, which is not directly addressed by the Treaty and which is of fundamental relevance for the present discus-

[26] For an analysis of Article II of the Outer Space Treaty, see Stephen Gorove, *Interpreting Article II of the Outer Space Treaty*, *in* PROCEEDINGS OF THE ELEVENTH COLLOQUIUM ON THE LAW OF OUTER SPACE 40 (Am. Inst. of Aeronautics & Astronautics ed., 1968) [hereinafter Gorove, *Interpreting Article II*]; Wayne N. White Jr., *Interpreting Article II of the Outer Space Treaty*, *in* PROCEEDINGS OF THE FORTY-SIXTH COLLOQUIUM ON THE LAW OF OUTER SPACE 171 (Am. Inst. of Aeronautics & Astronautics ed., 2003); Fabio Tronchetti, *The Non-Appropriation Principle as a Structural Norm of International Law: A New Way of Interpreting Article II of the Outer Space Treaty*, 33 AIR & SPACE L. 277 (2007); MANFRED LACHS, THE LAW OF OUTER SPACE 42 (1972); STEPHEN GOROVE, DEVELOPMENTS IN SPACE LAW: ISSUES AND POLITICS 25 (1991); Virgiliu Pop, *Appropriation in Outer Space: The Relationship Between Land Ownership and Sovereignty on the Celestial Bodies*, 16 SPACE POLICY 275 (2000).

[27] For a description of Article I of the Outer Space Treaty, *see* Nandasiri Jasentuliyana, *Review of Recent Discussions Relating to Aspects of Article I of the Outer Space Treaty*, *in* PROCEEDINGS OF THE THIRTY-SECOND COLLOQUIUM ON THE LAW OF OUTER SPACE 7 (Am. Inst. of Aeronautics & Astronautics ed., 1989); Z. Qiwu, *Reflections on the Most Important Principle of Outer Space Law: To The Common Interests of All Mankind*, *in* PROCEEDINGS OF THE THIRTY-SECOND COLLOQUIUM ON THE LAW OF OUTER SPACE 25 (Am. Inst. of Aeronautics & Astronautics ed., 1989); GYULA GAL, SPACE LAW 139 (1969); E. Galloway, *The United States and the 1967 Treaty on Outer Space*, *in* PROCEEDINGS OF THE FORTIETH COLLOQUIUM ON THE LAW OF OUTER SPACE 18, 24-27 (Am. Inst. of Aeronautics & Astronautics ed., 1997); Ram Jakhu, *Developing Countries and the Fundamental Principles of International Space Law*, *in* NEW DIRECTIONS IN INTERNATIONAL LAW 360 (Rafael Gutierrez Girardot et al. eds., 1982).

sion, concerns the use of outer space resources. In this respect, the main question is whether or not the prohibition on appropriation of outer space is also applicable to its resources. No clear-cut answer can be provided based on the current legal framework. While some authors express the view that the restriction in Article II applies equally to outer space and its resources,[28] others, the majority, argue that by analogy with the rules regulating the freedom of the high seas,[29] the appropriation of space resources merely forms part of the freedom of exploration and use of outer space.[30] This paper shares the opinion of the second group of authors.

The only limit to the possibility of appropriating extraterrestrial resources is to be found in paragraph 1, Article I of the Outer Space Treaty, which states that: "the exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interest of all countries, irrespective of their degree of economic and scientific development, and shall be the province of all mankind."[31] The concept of "province of all mankind" must not be confused with that of "common heritage of mankind." These two concepts have different meanings and diverse legal implications. In general, paragraph 1 means that the exploration and use of outer space, being the province of all mankind, should not serve only the interests of those States that have the technological capability to explore and utilize outer space but of all States. The drafters of the Outer Space Treaty considered the space era as an opportu-

---

[28] *See, e.g.*, Gorove, *Interpreting Article II*, *supra* note 26, at 40; A.A. Cocca, 54 INT'L L. ASS'N REP. CONF. 409, 427, 434 (1970) (discussing Professor Cocca's contention that the principle of non-appropriation extends to the Moon and other celestial bodies); *Id*. at 41012 (comments of M. Markoff).

[29] The fact that the high seas are considered *res communis omnium* does not prevent nations from fishing there. *See* Henry R. Hertzfeld & Frans G. von der Dunk, *Bringing Space Law into the Commercial World: Property Rights Without Sovereignty* , 6 CHI. J. INT'L L. 81 (2005).

[30] D. Goedhuis, *Some Recent Trends in the Interpretation and the Implementation of the Rules of International Space Law*, 19 COLUM. J. TRANSNAT'L L. 213, 219 (1981); Carl Q. Christol, *Article II of the 1967 Principles Space Treaty Revisited*, 9 ANNALS OF AIR & SPACE L. 217 (1984).

[31] Outer Space Treaty, *supra* note 12, at art. I, para 1.

nity for development for all humankind.[32] It is, however, generally understood that Article 1 of the Outer Space Treaty does not set forth any mandatory requirement to share benefits resulting from space operations.

Additionally, Article I paragraph 3 confers on States the right to freely carry out scientific investigation in outer space, including the Moon and other celestial bodies.[33]

To summarize, the Outer Space Treaty lays down certain principles which have a direct impact on the exploration, use, and exploitation of the Moon and its natural resources. These principles are 1) the prohibition of national appropriation of outer space or any celestial bodies; 2) the freedom of exploration, use of, and access to the space environment; 3) the freedom of scientific investigation in outer space; 4) the non-prohibition to appropriate outer space resources; and 5) the exploration and use of outer space, including the Moon and other celestial bodies, to be carried out for the benefit of all countries.

When the United States completed the first successful Moon landing in 1969 and samples of lunar rocks were brought to Earth, awareness of the presence of valuable resources in the lunar soil, such as minerals, and the possibility to remove and use such resources spread among the members of COPUOS. Due to the fact that the Outer Space Treaty, while laying down the foundations of the legal order of outer space by means of general principles, did not provide detailed solutions of all problems which could arise in the course of the further exploration of the Moon and the planets of the solar system, in particular to those problems related to the exploitation of the extraterrestrial natural resources, States decided to enter into negotiation for drafting a new legal instrument specifically dealing with activities on the Moon and other celestial bodies.[34] The road towards

---

[32] Paul Dembling & Daniel M. Arons, *The Evolution of the Outer Space Treaty*, 33 J. AIR L. & COMM. 419 (1967).

[33] Outer Space Treaty, *supra* note 12, at art. I, para. 3.

[34] The need to set up a specific regime regulating the use of lunar resources was clearly stated in the Preamble of the "Draft Agreement on the Principles Governing Activities of States in the Use of the Natural Resources of the Moon and Other Celestial Bodies", submitted by Argentina on 3 July 1970. The text of the Argentina's proposal is available in Harold W. Bashor, *Interpretation of the Moon Treaty: Recourse to Working*

the Moon Agreement was thus open. The Moon Agreement represented an attempt to modify the legal status of the Moon by declaring the Moon and the other celestial bodies "the common heritage of mankind."

IV. THE MOON AGREEMENT: APPLYING THE COMMON HERITAGE OF MANKIND CONCEPT TO THE EXPLOITATION OF THE NATURAL RESOURCES ON THE MOON AND OTHER CELESTIAL BODIES

A. Preliminary considerations

The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, better known as the Moon Agreement, was adopted on 5 December 1979 in New York, opened for signature on 18 December 1979, and entered into force on 11 July 1984, when the fifth instrument of ratification was deposited.[35] As of 1 November 2009 the Moon Agreement has 13 ratifications, with an additional four States being signatories to it.[36] This rather limited level of acceptance makes it difficult to give any binding force to the provisions of the Agreement outside the small circle of those party to it.[37]

Despite the fact that the Moon Agreement enjoys rather limited support, the analysis of the norms it provides is impor-

---

Papers and Related International Documents, XXXII ANNALS OF AIR AND SPACE L. 149, 156 (2007).

[35] Moon Agreement, *supra* note 8. Unlike the Outer Space Treaty and the Rescue Agreement, that required acceptance by the United States, the Soviet Union, and the United Kingdom before they could enter into force, the Moon Agreement only required the ratification of five States to enter into force. With ratification by Chile, the Philippines, Uruguay, the Netherlands, and Austria the Moon Agreement entered into force on July 11, 1984.

[36] The thirteen States which have ratified the Moon Agreement are: Australia, Austria, Chile, Mexico, Morocco, the Netherlands, Pakistan, the Philippines, Uruguay, Kazakhstan, Belgium, Peru and Lebanon. Four additional States have only signed the Agreement: France, Guatemala, India and Romania. *See* United Nations Office for Outer Space Affairs, Status of International Agreements Relating to Activities in Outer Space, http://www.oosa.unvienna.org/oosa/en/SpaceLaw/treatystatus/index.html (last visited Jan. 17, 2011).

[37] *See* Eileen Galloway, *Guidelines for the Review and Formulation of the Outer Space Treaties*, *in* PROCEEDINGS OF THE FORTY-FIRST COLLOQUIUM ON THE LAW OF OUTER SPACE 245, 248 (Am. Inst. of Aeronautics & Astronautics ed., 1998).

tant for several reasons.[38] First of all, it is the only existing legal instrument which specifically tries to regulate the exploration, use, and exploitation of the Moon and other celestial bodies and their natural resources. Although unsuccessful, the Agreement is an important development in the field of space law. Secondly, some States are parties to it; therefore, it cannot be totally disregarded. Thirdly, the feasibility of future adhesion to the Agreement must be verified. In short, is it likely or not that States would ratify the Agreement in the future? Fourthly, understanding the causes of the failure of the Agreement is important in order to avoid the same mistakes when drafting a new legal instrument aimed at regulating the exploitation of extraterrestrial resources.

B. The Moon Agreement

According to its Preamble, one of the main reasons for the conclusion of the Moon Agreement was the possibility to exploit the natural resources of the Moon, which seemed a feasible option in the not-too-distant future. Therefore, the Agreement aims at creating conditions for the peaceful, orderly, and fair development of lunar activities, with particular attention to the interests of less developed States.

The Moon Agreement follows the provisions of the Outer Space Treaty in many respects. First of all, it echoes the Outer Space Treaty as far as the *res communis omnium* character of the Moon is concerned. According to Article 11, paragraph 2, national appropriation of the Moon or any of its parts is prohib-

---

[38] For a broad analysis of the Moon Agreement see GENNADY ZHUKOV & YURI KOLOSOV, INTERNATIONAL SPACE LAW 173 (1984); CHENG, *supra* note 21, at 246; HAROLD W. BASHOR JR., THE MOON TREATY PARADOX (2004); THE MODERN INTERNATIONAL LAW OF OUTER SPACE, *supra* note 21, at 246; Per M. Wijkman & Clas G. Wihlborg, *Global Use and Regulation of Space Activities under the Common Heritage of Mankind Principle*, *in* SPACE ACTIVITIES AND IMPLICATIONS WHERE FROM AND WHERE TO AT THE THRESHOLD OF THE 80'S (Rapport du Symposium Organisé par le Centre de Recerche en Droit Aerien et Spatial McGill Inst.) 121 (Oct. 16-17 1980); L. VIKKARI, FROM MANGANESE NODULES TO LUNAR REGOLITH: A COMPARATIVE LEGAL STUDY OF THE UTILISATION OF NATURAL RESOURCES IN THE DEEP SEABED AND OUTER SPACE (2002); HENRI A. WASSENBERGH, PRINCIPLES OF OUTER SPACE LAW IN HINDSIGHT 39 (1991); Nandasiri Jasentuliyana & Roy S.K. Lee, 1 *Manual on Space Law* 253 (1979).

ited.[39] This concept is further elaborated by paragraph 3 of the same Article, which makes clear that the placement of personnel, space vehicles, facilities, stations, and installations on or below the surface or subsurface of the Moon does not create a right of ownership over the surface or subsurface of the Moon or any areas thereof.[40]

The Moon Agreement also reaffirms the first part of Article I of the Outer Space Treaty in declaring the exploration and use of the Moon to be the province of all mankind. This concept is further developed by the Agreement, in the sense that such an exploration and use must be carried out with due regard to the interests of present and future generations,[41] to the need to promote higher standards of living and conditions of economic and social progress and development,[42] and to the necessity to prevent the disruption of the lunar environment.[43]

Consequently, it can be stated that the exploration and use of the Moon shall be considered the province of all mankind, and not the common heritage of mankind, even by the States parties to the Moon Agreement.[44] As will be explained later, the concept of the common heritage of mankind is only applicable to the exploitation of natural resources of the Moon.

In addition, the Moon Agreement expands the freedom of scientific investigation laid down in Article I, paragraph 3 of the Outer Space Treaty, by providing State parties with the right to collect samples of lunar mineral and other substances and to use them for scientific purposes.[45] This provision should be read together with those allowing States parties to land space objects; to place personnel, equipment, and facilities; and to establish manned and unmanned stations on the Moon.[46]

---

[39] Moon Agreement, *supra* note 8, at art. 11, para. 2.

[40] *Id.* at art. 11, para. 3.

[41] *See* Moon Agreement, *supra* note 8, at art. 4 para. 1.

[42] *Id*.

[43] *Id.* at art. 7 para. 1.

[44] *See The Dark Side of the Moon*, *supra* note 27, at 121-22 (Am. Inst. of Aeronautics & Astronautics ed., 1997).

[45] *See* Moon Agreement, *supra* note 8, at art. 6, para. 2.

[46] *Id.* at art. 8, paras. 1 and 2, art. 9, para. 1.

The most innovative, as well as controversial, provisions of the Moon Agreement are contained in its Article 11, which declares the Moon and its natural resources to be "the common heritage of mankind."[47]

C. The common heritage of mankind concept

The common heritage of mankind is a rather young concept of international law which has been developed in the 1970s[48] and early 1980s and which found application in two international legal instruments, the Moon Agreement and the 1982 Law of the Sea Convention.[49]

---

[47] For an analysis of the Common Heritage of Mankind concept, see Stephen Gorove, *The Concept of "Common Heritage of Mankind": A Political, Moral or Legal Innovation?* 9 SAN DIEGO L.REV. 390 (1972); G.M. Danilenko, *The Concept of the Common Heritage of Mankind in International Law*, 13 ANNALS AIR & SPACE L. 247 (1988); R. Wolfrum, *The Principle of the Common Heritage of Mankind*, *in* 43 ZEITSCHRIFT FÜR AUSLANDISCHES OFFENTLICHES RECHT UND VOLKERRECHT 312 (1983); Kunihiko Tatsuzawa, *Political and Legal Meaning of the Common Heritage of Mankind*, *in* PROCEEDING OF THE TWENTY-NINTH COLLOQUIUM ON THE LAW OF OUTER SPACE 84 (Am. Inst. of Aeronautics & Astronautics ed., 1986); Mary Victoria White, *The Common Heritage of Mankind: An Assessment*, 14 CASE W. RES. J. INT'L L. 509 (1982); Carl Q. Christol, *The Common Heritage of Mankind Provisions in the 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, 14 INTERNATIONAL LAW 429 (1980); Vladimir Kopal, *Outer Space as a Global Common*, *in* PROCEEDINGS OF THE FORTIETH COLLOQUIUM ON THE LAW OF OUTER SPACE 108 (Am. Inst. of Aeronautics & Astronautics ed., 1997).

[48] The common heritage of mankind with regard to the ocean was proposed by United Nations Arvid Pardo of Malta in 1967. In his speech at the United Nations General Assembly he suggested to declare the seabed, the ocean floor beyond the limits of national jurisdiction, and its resources as the common heritage of mankind. *See* U.N. Doc. A/6695 (18 August 1967). With regard to outer space, the concept was put forward by Ambassador A.A. Cocca who used the expression "*res communis humanitatis*" in a proposal submitted to the Legal Subcommittee of the UN General Assembly Committee on the Peaceful Uses of Outer Space (COPUOS). *See* Aldo Armando Cocca, *The Common Heritage of Mankind: Coctrine and Principle of Space Law*, *in* PROCEEDINGS OF THE TWENTY-NINTH COLLOQUIUM ON THE LAW OF OUTER SPACE 17 (Am. Inst. of Aeronautics & Astronautics ed., 1986).

[49] United Nations Convention on the Law of the Sea, Montego Bay, 10 December 1982, in force 16 November 1994, 21 ILM 1245 (1982) [hereinafter Convention on the Law of the Sea]. Article 136, Part XI of the Convention declares the Area and its resources to be the common heritage of mankind. For a description of the provisions of the Convention, see B.H. Heim, *Exploring the Last Frontiers for Mineral Resources: A Comparison of International Law Regarding the Deep Seabed, Outer Space, and Antarctica*, 23 VAND. J. TRANSNAT'L L. 819, 825-28 (1990); *The Law of the Sea: Concept of the Common Heritage of Mankind: Legislative History of Article 133 to 150 and 311 of the United*

From a legal perspective the common heritage of mankind concept is an evolution of the *res communis omnium* theory. As previously analyzed, this theory, while preventing the acquisition of sovereignty rights over an area, allows for general exploration and use of the area and the resources contain therein.

The common heritage of mankind differs from this theory in several respects. It is based on the assumption that all human beings are members of the human race irrespective of which part of the world they live and that all of them should be given the same opportunity for improving their economic and living conditions.[50] Starting from this assumption, the common heritage of mankind concept holds that all States acting together on behalf of mankind as a whole, should share in the management of certain areas that, due to the economic and scientific value of the resources contained there, are considered to be the common heritage of mankind.[51] In particular, this concept requires that all activities within the common heritage of mankind area, particularly those aimed at exploiting the area's resources, must be carried out only in accordance with the rules set forth by an international regime, whose primary purpose is the orderly management of the area and the equitable sharing by all States of the benefits generated thereof, taking into particular account the needs of developing States irrespective of their degree of involvement in those activities.[52] The common heritage of mankind incorporates some further elements, such as the preservation of the area's environment, the peaceful nature of the activi-

---

Nations Convention on the Law of the Sea, DIVISION FOR OCEAN AFFAIRS AND THE LAW OF THE SEA, OFFICE OF LEGAL AFFAIRS, UNITED NATIONS 187 (1996).

[50] Christopher C. Joyner, *Legal Implications of the Concept of the Common Heritage of Mankind*, 35 INT'L & COMP. L.Q. 190 (1986); Harminderpal Singh Rana, *The Common Heritage of Mankind and the Final Frontier: A Revaluation of Values Constituting the International Legal Regime for Outer Space Activities*, 26 RUTGERS L.J. 225 (1994).

[51] G.M. Danilenko, *The Concept of the Common Heritage of Mankind in International Law*, 13 ANNALS AIR & SPACE L. 247 (1988).

[52] Kevin V. Cook, *The Discovery of Lunar Water: AN Opportunity to Develop a Workable Moon Treaty*, 11 GEO INT'L. ENVTL. L. REV. 647 (1994).

ties carried out in the area, and the freedom of scientific investigation.[53]

The problem with the common heritage of mankind concept is that developing and developed States hold opposite views about its interpretation and application.[54] The former group advances a "common property" interpretation of the common heritage of mankind concept for areas beyond national jurisdiction.[55] This common property approach requires common management of such areas and common sharing by all States of the mined resources and the benefits generated therein, regardless of the level of participation in the exploitative activities. The latter group, and in particular the United States, refuse the interpretation of the common heritage of mankind concept proposed by the developing countries.[56] In their view, the concept should be interpreted in such a way as to exclude changes in the existing conditions for access to international resources.[57] In particular, the concept should not lead to a modification of the traditional freedom of the high sea, which provides States with freedom of exploration and use. Accordingly, developed States only recognize that the common heritage of mankind may contribute to certain improvement in the distribution of financial and other benefits derived from the exploitation of the resources located in the common heritage of mankind area.[58] In this respect, the special needs of developing States should be taken into consideration. However, only the States exploiting the resources are entitled to decide how to share them and what is equitable.

---

[53] Cook, *supra* note 52; L.M. Fountain, *Creating Momentum in Space: Ending the Paralysis Produced by the Common Heritage of Mankind Doctrine*, 35 CONN. L. REV. 1753 (2003).

[54] *See* Harminderpal Singh Rana, *supra* note 50; *see also* Mary Victoria.White, *supra* note 47.

[55] M.C.W. Pinto, Alternatives in Mining, PROCEEDINGS, LAW OF THE SEA INSTITUTE (1978).

[56] Hearings on the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Before the Subcomm. On Science, Technology, and Space of the Senate Comm. On Commerce, Science and Transportation, 96th Cong. 2nd Sess. (1980), Statement of Robert B. Owen, Legal Advisor to the United States Secretary of State [hereinafter Hearings].

[57] *Id*.

[58] F. Tronchetti, *supra* note 11, at 109.

The impossibility of reaching a common understanding of the meaning and legal effect of the common heritage of mankind concept caused the failure of both the 1982 Law of the Sea Convention and the 1979 Moon Agreement.

D. Article 11 of the Moon Agreement

The insertion of the common heritage of mankind into Article 11 of the Moon Agreement represented the most debated point of discussion during the negotiations of the Agreement.[59] For instance, the Soviet Union was particularly against it and declared that the common heritage of mankind was merely a philosophical concept with "no real and practical meaning at the present stage of activities relating to the Moon."[60] The United States, at least during the negotiating phase of the Moon Agreement, supported the application of the common heritage of mankind to the Moon and its resources.[61] These contrasts lasted until the end of the negotiations. It was only in the middle of 1979 that all States agreed to introduce the common heritage of mankind concept into the text of the Moon Agreement, particularly in its Article 11.

Article 11 paragraph 1 declares that: "The Moon and its natural resources are the common heritage of mankind."[62] It specifies that the common heritage of mankind "finds its expression in the provisions of this Agreement, in particular in paragraph 5 of this Article."[63] This indicates that the interpreta-

---

[59] The proposal to declare the natural resources of the Moon the common heritage of mankind was first put forward by Argentina in 1970. *See Argentinian Draft Agreement on the Principles Governing the Activities on the Use of Natural Resources of the Moon and Other Celestial Bodies*, Annex II, U.N. Doc. A/AC. 105/85 (1970).

[60] U.N. Doc. A/AC.105/C.2/SR.204 (April 19, 1973) (on file with author).

[61] The Working Paper 12/Revision 1, proposed by the United States on April 12, 1972, proposed, inter alia, that "[t]he natural resources of the Moon and other celestial bodies shall be the common heritage of mankind." U.N. Doc. A/AC.105/C.2 (XI) (on file with author).

[62] Moon Agreement, *supra* note 8, at art. 11, para. 1.

[63] For the analysis of the legal meaning of Article 11 of the Moon Agreement see, Stanley B. Rosenfield, *Article XI of the Draft Moon Agreement*, *in* PROCEEDINGS OF THE TWENTY-SECONDTH COLLOQUIUM ON THE LAW OF OUTER SPACE 209 (Am. Inst. of Aeronautics & Astronautics ed., 1979); Stephan Hobe, *Common Heritage of Mankind-An Outdated Concept in International Space Law?*, *in* PROCEEDINGS OF THE FORTY-FIRST COLLOQUIUM ON THE LAW OF OUTER SPACE 271 (Am. Inst. of Aeronautics & Astronautics

tion of the common heritage of mankind concept should be made by taking into consideration only the provisions of the Moon Agreement with no reference to principles and rules provided for by any other treaty, including the 1982 Law of the Sea Convention.

While the Outer Space Treaty does not make any specific reference to outer space resources, the Moon Agreement clearly indicates that the natural resources of the Moon and other celestial bodies are the common heritage of mankind. This means that the exploitation of such resources must be carried out only under that concept. This idea is further developed by paragraph 3, according to which "neither the surface nor the subsurface of the Moon, nor any part thereof or natural resources in place, shall become the property of any State" or any other operator performing activities on the Moon.[64]

Paragraph 5 contains the commitment of States parties to establish an international regime, including appropriate procedures, to govern the exploitation of the natural resources of the Moon, when this exploitation is about to become feasible. This legal regime should include provisions guaranteeing

> a) the orderly and safe development of the natural resources of the Moon; b) the rational management of those resources; c) the expansion of opportunities in the use of those resources; 4) an equitable sharing by all States in the benefits derived from those resources, whereby the interests and needs of the developing countries, as well as the efforts of those countries which have contributed either directly or indirectly to the exploration of the Moon shall be given special consideration.[65]

At this point of the analysis some considerations are needed. First of all, as previously mentioned, the Moon Agree-

---

ed., 1998); Ricky J. Lee, *Creating an International Regime for Property Rights Under the Moon Agreement*, *in* PROCEEDINGS OF THE FORTY-SECOND COLLOQUIUM ON THE LAW OF OUTER SPACE 409 (Am. Inst. of Aeronautics & Astronautics ed., 1999); Keven V. Cook, *The Discovery of Lunar Water: An Opportunity to Develop a Workable Moon Treaty*, 11 GEO.INT'L ENVTL. L. REV. 647 (1999).

[64] Moon Agreement, *supra* note 8, at art. 11, para. 3.

[65] *Id.* at art. 11, para 7.

ment makes a clear distinction between exploration, use, and scientific research, which are regulated under the *res communis omnium* concept, and exploitation, which falls under the concept of the common heritage of mankind. This signifies that while lunar resources can be freely used for scientific purposes, their commercial exploitation can only take place in accordance with the provisions and principles laid down in Article 11. Secondly, the Moon Agreement does not set out an international regime to govern the exploitation of natural resources. Indeed, unlike the 1982 Law of Sea Convention which establishes an International Seabed Authority responsible for licensing and regulating the exploitation of resources located in the seabed beyond the limits of national jurisdiction, as well as several provisions dealing with the exploitative activities,[66] the Moon Agreement only expresses the intention of States to negotiate a legal regime when the exploitation of extraterrestrial resources is about to become feasible. However, there is no mandatory value in such provision. The obligation undertaken by States under Article 11(5) is no more than a *pactum de negotiando*, which means that States shall negotiate in good faith in order to reach an agreement on such a regime, but they are not bound to reach agreement at whatever cost.[67]

V. THE LIMITS OF THE MOON AGREEMENT: EXPLAINING THE FAILURE OF THE AGREEMENT AND ITS DETRIMENTAL EFFECT ON THE COMMERCIAL EXPLOITATION OF EXTRATERRESTRIAL NATURAL RESOURCES

A. Preliminary considerations

When the Moon Agreement was opened for signature and ratification in 1979, it became clear that it had limited chances of success. The interpretation of the common heritage of mankind concept still stood as a point of major contrast between developing and developed States. In particular, the newly elected

---

[66] Convention on the Law of the Sea, *supra* note 49, at Part XI.

[67] *See* Carl Q. Christol, *The 1979 Moon Agreement: Where Is It Today?*, 27 J. SPACE L. 1, 14-15 (1999).

American administration considered the common heritage of mankind concept to be detrimental to U.S. interests and to create unacceptable restraints on the intention of the United States to exploit resources beyond any national jurisdiction.[68] In addition, the majority of developed States shared the U.S. refusal to accept the interpretation of the common heritage of mankind concept as "common property," which was advanced by the developing States.[69] Due to the impossibility of reaching an agreement on the interpretation of the common heritage of mankind, both developed and developing States decided not to ratify the Moon Agreement. The situation was made worse by the unclear and vague character of the provisions of Article 11 of the Agreement, which contributed to increased uncertainty about the legal consequences deriving from the application of that concept.

Despite its limited acceptance, today it is very important to analyze the Moon Agreement once more. As described in the introduction of this paper, in recent years the major space powers have shown a vivid interest in the Moon and its natural resources. This fact raises questions related to the role that the Moon Agreement can have in the upcoming era of activities involving lunar and other celestial bodies and, in particular, whether it is likely or not that States will ratify the Agreement in the near future.

When analyzing the potential impact of the Moon Agreement there is a preliminary point to be considered: the exploitation of the natural resources of the Moon and other celestial bodies is a risky and expensive task. Primarily, carrying out activities in outer space is a hazardous business.[70] Many things can go wrong in space and the smallest mistake or unexpected event may result into the destruction of a space object and the

---

[68] Hearings, *supra* note 56.

[69] Wayne White Jr., *Real Property Rights in Outer Space*, PROCEEDINGS OF THE FORTIETH COLLOQUIUM ON THE LAW OF OUTER SPACE 1 (Am. Inst. of Aeronautics & Astronautics ed., 1997).

[70] See in this respect Brian M. Hoffstadt, *Moving the Heavens: Lunar Mining and the "Common Heritage of Mankind" in the Moon Treaty*, 42 UCLA L. REV. 575, 580 & n.24 (1994); Richard Berkley, *Space Law Versus Space Utilization: The Inhibition of Private Industry in Outer Space*, 15 WIS. INT'L L.J. 421, (1997).

death of its occupants. Secondly, developing safe and reliable technology to exploit extraterrestrial resources and to establish, as well as maintain, a permanent manned lunar basis requires huge financial investments. These two elements create serious obstacles to the actual commencement of the exploitation of lunar resources.

A method to soften their negative impact may be the establishment of a legal regime to regulate exploitation. On one side, this legal regime may enhance the safety of space operations, by laying down strict rules to be respected by the participants of such an exploitation; on the other side, it may encourage space entrepreneurs to invest their money in the exploitation of lunar resources, by making clear that is possible to make profit from it.

The main question is, then, whether or not the Moon Agreement creates a legal environment enabling the safe, orderly, and profitable development of the exploitation of the natural resources of the Moon. Particularly, it must be ascertained whether the Agreement has a positive or negative impact on the commercial use of such resources.

The answer to both questions is negative. The Moon Agreement does not contain clear rules describing how the exploitation of extraterrestrial resources has to be carried out and what the rights and duties of the parties involved in it are. On the contrary its provisions are rather vague and leave vast room for diverging interpretations. As a result it has a detrimental effect on the commercial development of lunar resources, as it is not possible to foresee if, and to what extent, it is possible to turn the exploitation of these resources into a profitable business.

The following section will provide a detailed analysis of the main limitations of provisions of the Moon Agreement.

B. Limits of the Moon Agreement

Article 11, paragraph 7 indicates that one of the purposes of the international regime is "equitable sharing" by all States

Parties in the benefits derived from the natural resources of the Moon.[71] How should this provision be interpreted? What does "equitable" mean?[72] Does it mean "equal," as suggested by the developing States, requiring that the benefits to be equally shared among all States regardless of their involvement in the exploitative activities, or does it mean "equal" in its literal sense, as proposed by developed States, providing the States directly involved in these activities with a bigger power to decide how the benefits should be shared? The present paper agrees with the literal interpretation. If the drafters of the Agreement had wanted to give another meaning to the terms "equitable," they would have clearly done so. Nevertheless, the problem concerning the exact meaning to be attributed to the term "equitable" remains.

Another problem concerns the term "benefit": what are the benefits derived from the natural resources of the Moon? The profits resulting from the commercial use of such resources? The technologies used to mine the resources? The resources themselves? This uncertainty creates a big problem. An agreement which aims at regulating the exploitation of the natural resources of the Moon cannot leave aside the problem of the definition of the term "benefit." This term must be defined before and not after the exploitation has begun. Such lack of clarity is not beneficial to anyone and prevents space operators, particularly private ones, to invest in extraterrestrial exploitative ventures.

The Moon Agreement also leaves unanswered three questions of major importance: 1) Is it possible to acquire property rights over the lunar natural resources once they have been removed from their original location? 2) Is the exploitation of lunar and other celestial bodies' resources prohibited before the establishment of an international regime? 3) Which is the legal regime in force pending the setting up of the legal regime? These three questions are clearly strictly related.

---

[71] Moon Agreement, *supra* note 8, at art. 11, para. 7.

[72] On this point, see Ram Jakhu, *Twenty years of the Moon Agreement: Space Law Challenges for Returning to the Moon*, 2005 ZLW [GERMAN J. AIR & SPACE L.] 243 (F.R.G.) [hereinafter Jakhu, *Twenty years of the Moon Agreement*].

As to the first question, the majority of legal scholars agree that once extraterrestrial natural resources have been removed from their original location, they can become the property of whoever extracted them. Such thesis is, for instance, supported by an eminent author like Christol, which stated that: "by the introduction of the term "in place" [in Article 11, paragraph 3[73]] the negotiators intended to legalize the removal of natural resources from the surface or the subsurface of the Moon thereby establishing the right of ownership and of property in the possessors of such resources."[74] Other authors argue that although the expression "in place" restricts the application of "the non-appropriation principle to natural resources as long as they are not removed from their original place," this does not automatically lead to "the conclusion that appropriation can take place at random when the natural resources are being moved."[75] In this respect Article 11 (5) constitutes a limit to the possibility of appropriating resources once removed, as it contains the commitment of States to set out an international regime to govern the exploitation of lunar recourses as soon as this exploitation is feasible. Nevertheless, the analysis of the *traveaux préparatoires* of the Agreement shows that the term "in place" was inserted with the specific purpose to allow the creation of property rights over the resources once removed from their original location.[76]

The second question concerns the presence of a moratorium on the use of lunar resources pending the establishment of an international regime. The Moon Agreement does not explicitly impose any moratorium in the pre-regime period. Hence, the space-faring States, particularly the United States,[77] and the

---

[73] This is added to the original Christol's text for reasons of clarity.

[74] THE MODERN INTERNATIONAL LAW OF OUTER SPACE, at 262. A similar approach is held by Eileen Galloway, *Status of the Moon Treaty*, SPACE NEWS 3-9, 21 (1998).

[75] H.L. van Traa-Engelman, *Clearness Regarding Property Rights on the Moon and Other Celestial Bodies*, *in* PROCEEDINGS OF THE THIRTY-NINTH COLLOQUIUM ON THE LAW OF OUTER SPACE 38 (Am. Inst. of Aeronautics & Astronautics ed., 1996).

[76] *See, e.g.*, the US position contained in working paper n. 15, 1973 presented during the negotiations of the Moon Agreement and reaffirmed in 1979, see COPUOS, U.N. Doc. A/AC.105/P.V. 203, 22 (July 16, 1979) (on file with author).

[77] In 1979 the US representative suggested to other member of COPUOS that "[t]he Agreement places no moratorium upon the exploitation of the natural resources of celes-

majority of the legal scholars[78] argue that States are allowed to use and exploit the natural resources of the Moon before such regime is set up. This interpretation is not shared by the developing States. In their view, the exploitation of lunar resources shall be carried out only in accordance with rules and procedures laid down by an international regime.

This leads to the discussion of the third question: what is the legal regime in force before the establishment of the international regime? Namely, is the common heritage of mankind applicable pending its establishment?

Before the international regime is established, the legal regime applicable to lunar and other celestial bodies' resources is not the common heritage of mankind but that provided for by the Outer Space Treaty, which enables States and private operators to freely explore and use these resources as long as this does not impede others from doing the same.

This argument is used by some authors to support the assertion that the Moon Agreement does not restrict the commercial exploitation of extraterrestrial resources but that, on the contrary, encourages it. Relying on the fact that until the regime is established there is no requirement to share the benefits generated by such exploitation, these authors claim that in the pre-regime period the Moon Agreement gives private operators several opportunities to make profits.[79] Later on, when the legal regime is under discussion, private operators will be strong enough to protect their interests. Hence, they will still be able to make large profits even after the regime is set up. These authors, therefore, conclude that all States should ratify the Moon

---

tial bodies, pending the establishment of an international regime", *see* U.N. Doc. A/AC.105/P.V. 203, *supra* note 76. This statement did not receive any objection by the representative of the Soviet Union. *See id*, at 43-45.

[78] *See* Sylvia Maureen Williams, *The Law of Outer Space and Natural Resources*, 36 INT'L & COMP. L.Q. 142, 147 (1987); Patricia M. Sterns, G. Harry Stine & Leslie I. Tennen, *Preliminary Jurisprudential Observation Concerning Property Rights on the Moon and Other Celestial Bodies in the Commercial Age*, *in* PROCEEDINGS OF THE THIRTY-NINTH COLLOQUIUM ON THE LAW OF OUTER SPACE 50 (Am. Inst. of Aeronautics & Astronautics ed., 1996); Ricky J. Lee, *supra* note 63.

[79] *See* Jakhu, *supra* note 72; Carl Q. Christol, *The Moon Treaty and the Allocation of Resources* 22, pt.2, ANNALS OF AIR & SPACE L. 31 (1997).

Agreement. Failure to ratify it would be detrimental not only to States but also to their nationals.

This argument is not acceptable. It is true that pending the setting up of the regime, there is no requirement to share benefits, as the provisions of the Outer Space Treaty are in force. However, this situation, and the advantages which it may generate, is only temporary. Indeed, as soon as the exploitation of extraterrestrial resources is feasible, an international regime, requiring the equitable sharing of the benefits, is to be established. A similar scenario is surely not encouraging but rather detrimental to the interest of private operators.[80]

An example may contribute to better explain this point. A private company of a State which has ratified the Moon Agreement intends to carry out the exploitation of the resources located in a certain lunar site. As an international regime to regulate such exploitation has not been established yet, the private company expects to be able to keep the benefits resulting from its activities and not to be requested to share them with others. After receiving authorization from its State, the company starts its exploitative activities on the Moon. However, as soon as the other Parties to the Agreement become aware of these developments, which clearly demonstrates that the exploitation of natural resources of the Moon is feasible, they decide to convene a conference to set up an international regime to govern such activities. The State of that private company, too, will obviously attend the conference. If the conference is successful, an international regime containing provisions requesting space operators to equitably share the benefits derived from the exploitation of extraterrestrial natural resources, is adopted.

Obviously, this result would have a negative impact on the interests of the private company. Such company has started its space exploitative activities with the expectation of keeping the benefits generated from those activities; then, it would find itself under the obligation to share these benefits. Surely, during the negotiations phase the State of that company would try to protect its interests. Nevertheless, it is unquestionable that the

---

[80] *See* Brian M. Hoffstadt, *supra* note 70, at 590-91.

interests as well as the rights of these private companies would be damaged.

This simple example demonstrates that the Moon Agreement does not encourage but rather discourages the commercial development of the natural resources of the Moon. Without legal certainty as to the possibility to maintain the benefit, and as a result of the profits derived from the exploitation of such resources, States, and in particular private operators, will never invest in this type of activity.

This reasoning could be debated by saying that States are not obliged to establish an international agreement at all costs. If the pre-regime period is so profitable, States could decide not to establish a specific legal regime and to keep relying on the provisions of the Outer Space Treaty only. This approach is, however, very dangerous. The Outer Space Treaty does not lay down specific rules to govern the exploitation of space resources. It only establishes general principles, such as the freedom of exploration and use of outer space and the non-appropriative nature of the space environment. These principles, however, are not detailed enough to guarantee the safe and orderly development of the exploitation of the natural resources of the Moon. This exploitation raises specific legal issues which require specific answers. These answers cannot be obtained by relying on the provisions of the Outer Space Treaty alone. Those provisions need to be supplemented and extended with rules addressing all foreseeable scenarios and legal problems which may arise during these exploitative activities.

The Moon Agreement has some additional shortcomings. First of all, it does not deal with the issue of liability. Hence, it is reasonable to question the ability of the existing space law liability regime, as laid down in the Liability Convention, to cope with mining activities on the Moon, as they may result in different types of damage when compared to those addressed by the Liability Convention.

Secondly, the Moon Agreement does not clarify the meaning of "national activities," a term which refers to the activities carried out in space by private operators and for which a State can be held internationally responsible and which require authorization and supervision by the State. This uncertainty may lead

to confusion as to which State should regulate which private activities carried out on the Moon.

Before concluding this section it must be pointed out that in the last eight years, four States have ratified the Moon Agreement.[81] This development, which has been directly influenced by an effort undertaken by the COPUOS aimed at enhancing support of the existing space law treaties,[82] may lead some to think that other States are about to join the Agreement. However, this does not appear to be the case. There are no tangible indications that the major space powers are willing to adhere to the Moon Agreement. The analysis of the records of the COPUOS meeting gives no elements to support such hypothesis. Interestingly enough, this analysis reveals that in the last years, the Legal Subcommittee of COPUOS has paid particular attention to the status of the Moon Agreement. This is largely due to the initiative of some delegations, in particular the Colombian one, which at the forty-sixth session of the Legal Subcommittee in 2007 expressed the view that consideration should be given to the reasons behind the low number of ratifications of the Agreement and that efforts should be undertaken to remove obstacles to its participation.[83] This initiative was followed by the decision of the Legal Subcommittee to request the Working Group on the Status of Application of the five United Nations Treaties on Outer Space to address the issue of the lack of success of the Moon Agreement, by considering, inter alia, whether the existing international rules adequately address the activities on the Moon and other celestial bodies, also incorporating information from States already parties to it about the benefits of adherence to the Agreement. This call was answered by some of the States Parties to that Agreement which at the forty-seventh session of

---

[81] These States are Kazakhstan in 2001, Belgium in 2004, Chile in 2005 and Lebanon in 2007.

[82] The four recent ratifications are, at least partly, the result of an effort initiated by a Mexican proposal in April 1997 aimed at enhancing adherence to the five space treaties. This effort led to the insertion of a new item in the agenda of the Legal Subcommittee of COPUOS entitled "Review of the status of the five international treaties governing outer space." *See* U.N. Doc. A/AC.105/C.2/L.206/Rev.1 April 4, 1997). For an analysis of the Mexican initiative, *see* Christol, *supra* note 67, at 29-30.

[83] Report of the Legal Subcommittee on its forty-sixth session, held in Vienna from 26 March to 5 April 2007, U.N. Doc. A/AC.105/891, Annex 1 (2007).

the Legal Subcommittee held in March 2008 submitted a "Joint Statement on the benefits of the adherence to the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies by States parties to the Agreement."[84] The Joint Statement, which aims at encouraging States to sign and ratify the Agreement, emphasizes a number of its positive aspects. Firstly, according to the Statement, the Moon Agreement contains some innovative provisions, such as those on the establishment of a lunar basis and on the use of lunar resources to support activities on the Moon, which clarify some concepts previously expressed in the Outer Space Treaty and enhance scientific cooperation. Secondly, the Joint Statement claims that the solution adopted in Article 11 of the Agreement, namely, the decision to postpone the setting up of a legal regime until the moment in which the exploitation of lunar resources is about to be feasible, is an intelligent and obvious one. Most importantly, the Joint Statement argues that "the Agreement does not preexclude any modality of exploitation, by public and/or private entities, nor forbids commercial treatment, as long as such exploitation is compatible with the requirements of the Common Heritage of Mankind regime."

States reacted differently to the Joint Statement. While some delegations welcomed it noting its usefulness as a basis for further discussion and expressing satisfaction with the fact that the issue of the low rate of participation of States in the Moon Agreement was finally under consideration, others stressed that non-adherence to the Agreement had not hindered current or future lunar activities and that it was premature to arrive at any conclusion on the adequacy of existing rules governing activities on the Moon.[85]

---

[84] Joint statement on the benefits of adherence to the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies by States parties to the Agreement, U.N. Doc. A/AC.105/C.2/L.272. These States are Austria, Belgium, Chile, Mexico, the Netherlands, Pakistan and the Philippines. *Id.*

[85] Report of the Legal Subcommittee on its forty-seventh session, held in Vienna from 31 March to 11 April 2008, U.N. Doc. A/AC.105/917, para 42, and Annex I, paras 14-25 (2008); Report of the Legal Subcommittee on its forty-eighth session, held in Vienna from 23 March to 3 April 2009, U.N. Doc. A/AC.105/935, Annex I, paras 4-18 (2009).

What is significant for the purpose of this paper is the fact that the Joint Statement does not seem to have had so far any visible impact in encouraging major space–faring States to join the Moon Agreement. Indeed, not only have none of these States ratified the Agreement in the last two years, but they also have not even expressed the intention to do so in the near future. Apart from the above, it is also relevant that a conference to revise the Moon Agreement, as foreseen by its Article 18, has never been convened.[86] In 1994, ten years after its entry into force, COPUOS considered the question of a first review of the Agreement and the prospective of an international regime at its 37th session in 1994. However, the Committee recommended to the General Assembly to take no further action during the time being.[87] Such a conference would have represented an opportunity to re-open the debate on the Moon Agreement and to possibly encourage other States to join it. The fact that this conference has not been convened shows, once more, the limited interest of States in the Moon Agreement.

This part of the paper has demonstrated that the Moon Agreement is not the proper instrument to regulate the exploitation of the natural resources of the Moon. Due to the insertion of the common heritage of mankind concept and to the vague character of its provisions, the Agreement not only fails to create a clear legal framework to govern such exploitation but also has a detrimental effect on the commercial development of the lunar and other celestial bodies' resources. For these reasons, it

---

[86] Moon Agreement, *supra* note 8, at art. 18:

> Ten years after the entry into force of this Agreement, the question of the review of the Agreement shall be included in the provisional agenda of the General Assembly of the United Nations in order to consider, in the light of past application of the Agreement, whether it requires revision. However, at any time after the Agreement has been in force for five years, the Secretary-General of the United Nations, as depositary, shall, at the request of one third of the States Parties to the Agreement and with the concurrence of the majority of the States Parties, convene a conference of the States Parties to review this Agreement. A review conference shall also consider the question of the implementation of the provisions of article 11, paragraph 5, on the basis of the principle referred to in paragraph 1 of that article and taking into account in particular any relevant technological developments.

[87] G.A. Res. A/Res/49/34 (1995).

is very unlikely that States will ever decide to ratify the Moon Agreement. Hence, the need for setting up a new legal regime to regulate the commercial exploitation of extraterrestrial natural resources arises.

The provisions of the Outer Space Treaty are also not precise enough to ensure the safe and peaceful development of such exploitation. These provisions must be supplemented and further expanded so as to define the proper legal environment for the orderly as well as profitable exploitation of the natural resources of the Moon.

VI. A LEGAL REGIME TO REGULATE THE COMMERCIAL EXPLOITATION OF THE NATURAL RESOURCES OF THE MOON AND OTHER CELESTIAL BODIES

Having understood the need for establishing a legal regime to govern the commercial exploitation of extraterrestrial natural resources, the next step is to clarify how this regime should be organized and what its components should be.[88] As a matter of clarity, it must be indicated that the detailed explanation of the features of this regime goes beyond the purposes of the present paper. This section will, thus, only explain the essential points to be inserted in such regime.[89]

The starting point of the discussion is drawn up by the assumption that when developing a legal regime to govern the exploitation of extraterrestrial natural resources, two preliminary elements must be taken into consideration. First, such exploitation will never take place without the participation of private operators as well as space-faring States. Only these sub-

[88] For the analysis of the possibility of exploiting the natural resources of the Moon and other celestial bodies, see Mahulena Hofmann, *Recent Plans to Exploit the Moon Resources under International Law*, *in* PROCEEDINGS OF THE FORTY-SEVENTH COLLOQUIUM ON THE LAW OF OUTER SPACE 425 (Am. Inst. of Aeronautics & Astronautics ed., 2004); Barbara Ellen Heim, *Exploring the Last Frontiers for Mineral Resources: A Comparison of International Law Regarding the Deep Seabed, Outer Space and Antarctica*, 23 VAND. J. TRANSNAT'L L. 819, 830-36 (1990); Armal Kerrest, *New Developments and the Legal Rramework Covering the Exploitation of the Resources of the Moon*, *in* PROCEEDINGS OF THE FORTY-SEVENTH COLLOQUIUM ON THE LAW OF OUTER SPACE 530 (Am. Inst. of Aeronautics & Astronautics ed., 2004).

[89] This author has elaborated a proposal for a legal regime to regulate the exploitation of extraterrestrial natural resources in FABIO TRONCHETTI, *supra* note 11.

jects have the financial resources and technical expertise required to exploit extraterrestrial resources. Therefore, the legal regime must contain provisions which are able not only to protect the interests of these subjects but also to offer them a real chance to enjoy a return on the investments they made to carry out exploitative operations in outer space.

Secondly, the legal regime governing the exploitation of the natural resources of the Moon and other celestial bodies should be based on the principles laid down in the Outer Space Treaty, particularly the non-appropriative nature of outer space and the exploration and use of the space environment for the benefit of all mankind. These principles have contributed to more than forty years of peaceful and safe space activities. Hence, they should play a fundamental role also with regard to future activities in outer space.

A. A balance between these two elements is thus essential for the success of the proposed legal regime

The majority of lunar natural resources consist of minerals.[90] In order to be used, these minerals need to be removed from their original location.[91] Therefore, it is logical to foresee that the exploitation of these mineral resources will be organized in a three-phase process: 1) a pre-mining phase (including research, development, and exploration); 2) a mining phase; and 3) post-mining phase (including the commercial use of the extracted resources).

In order to be properly structured, the legal regime should clarify how this these three phases have to be organized, the rules applicable to all of them, and the rights and duties of the parties involved. In this way, space operators will have the certainty of the legal framework in force during the entire period in which the exploitative activities are taking place.[92]

---

[90] E. Robens, et al., *Investigation of surface properties of lunar regolith Part II*, 94 J. of Thermal Analysis and Calorimetry, 627-631, 627 (2008).

[91] G. FAURE & T. MENSING, AN INTRODUCTION TO PLANETARY SCIENCE, 165 (2007).

[92] For instance, issues like the duration of mining activities in a certain lunar site, property rights over the extracted resources and the benefits derived from their com-

To contribute to the orderly and safe development of the exploitative activities it would be possible to think about establishing an international authority. In this respect, the solutions adopted by the 1994 Implementation Agreement of Part XI of the Law of the Sea Convention[93] could be used as a valuable example. The 1994 Agreement introduces a new way of interpreting the common heritage of mankind which softens its stricter economic requirements and gives industrialized States a greater power to influence the decision-making mechanism.

This paper does not propose to insert the common heritage of mankind concept into the new legal regime aimed at regulating the exploitation of the natural resources of the Moon and other celestial bodies. It only suggests to take some of the most innovative and useful elements of the 1994 Implementation Agreement, such as the application of a free-market approach to the management of a certain international area and its resources, as well as a larger voice of developed States in the adoption of decision relating to the activities in the area, and to apply them to the exploitation of extraterrestrial resources.

The proposed legal regime should also contain the following features:

- a licensing mechanism to authorize private exploitative activities, either by means of national law or by decision of the international authority;
- provisions dealing with liability for damage caused to the lunar environment in the course of the exploitation of a site;
- a reliable and transparent mechanism monitoring exploitative activities;

---

mercial use, and the right to explore and exploit an area of the Moon should be addressed.

[93] Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982, New York, done 28 July 1994; 1836 U.N.T.S. 3; 33 I.L.M 1309, (1994), *entered into force* on 28 July 1996. For the analysis of the 1994 Implementation Agreement *see*, *e.g.*, Annick De Marffy-Mantuano, *Current Development: The Procedural Framework of the Agreement Implementing the 1982 United Nations Convention on the Law of Sea*, 89 AM. J. INT'L L. 814 (1995); Carol B. Thompson, *International Law of the Sea/Seed: Public Domain Versus Private Commodity*, 44 NAT. RESOURCES J. 841 (2004).

- a procedure for international registration of the exploitation activities taking place on the lunar or other celestial bodies' surface;
- a mechanism to settle disputes arising from the exploitation of extraterrestrial natural resources.

The last point of the above list is of particular interest. Although the main purpose of a legal regime is to prevent the emergence of disputes, it is quite unlikely that disputes will not arise in the course of the exploitation of extraterrestrial materials. Considering the fact that international space law does not set forth any compulsory dispute settlement mechanism and that without a method to settle conflicts a legal regime becomes less effective, as its rules cannot be properly enforced, the need for establishing a mechanism to settle disputes related to the exploitation of extraterrestrial resources emerges. This paper proposes to use as a model the dispute settlement mechanism operating in the context of the World Trade Organization (WTO).[94] This mechanism, which is based on the idea that the prompt settlement of disputes is essential for the proper functioning of the WTO, introduces a strict schedule for the time a case should take to be settled, with deadlines applicable to each stage of the procedure.[95] Thanks to these characteristics, the WTO dispute settlement mechanism has received worldwide acceptance and has proven to be successful.

The legal regime to govern the commercial exploitation of lunar and other celestial bodies' natural resources should be inserted in a new legal instrument, such as a treaty, to be opened for signature and ratification by States. Many could claim that negotiating a new treaty would take too long and that a simple amendment to the Moon Agreement would be a

---

[94] For an analysis of the WTO dispute settlement mechanism, see J. VAN GENT, WTO TRADE DISPUTES (2006); G. YANG, B. MERCURIO, & Y. LI, WTO DISPUTE SETTLEMENT UNDERSTANDINGS: A DETAILED INTERPRETATION (2005).

[95] Generally, if a case runs its full course, it takes about one year to arrive at a first ruling, fifteen months if the case is appealed. For more information on the WTO dispute settlement mechanism see World Trade Organization, Understanding the WTO: Settling Disputes, http://www.wto.org/english/thewto_e/whatis_e/tif_e/disp1_e.htm (last visited Feb. 4, 2011).

more feasible solution.[96] Surely amending an existing treaty is faster that drafting a new one. However, it is questionable that amending the Moon Agreement would be the best choice. First of all, the amendment should address several articles of the Agreement, as the majority of its provisions have an uncertain character. Reaching an agreement on these amendments would require time and long discussions. Secondly, it is very likely that, while indicating principles to be inserted in the regime to regulate the exploitation of extraterrestrial resources, the amended version of the Agreement would not actually contain that legal regime but rather the commitment of State Parties to establish it. This would mean that a new conference should be convened to define the text and contents of such legal regime. In this respect, it would be much more reasonable to directly negotiate a new legal instrument, specifically addressing the issue of the commercial exploitation of the natural resources of the Moon and other celestial bodies, which may have an immediate impact following its ratification by States.

This author is well aware of the fact that negotiating a new legal regime will be difficult. Nevertheless, under the current circumstances, the establishment of such a regime seems to be the most suitable option to guarantee the orderly and safe development of commercial activities on the Moon.

VII. CONCLUSION

In the light of the renewed interest of States in exploring and exploiting the Moon and its natural resources, it is worth analyzing the potential impact of the Moon Agreement on future lunar and other celestial bodies' activities. The above has demonstrated that, due to the unclear meaning of its provisions and to their negative influence on the commercial exploitation of lunar resources, it is unlikely that States would decide to ratify the Agreement in the near future. This calls for the establish-

[96] A significant proposal for amendment of the Moon Agreement has been put forward by the International Law Association (ILA). *See* INT'L L. ASS'N REP. CONF. 13-16 (2002); Frans G. von der Dunk, *The Moon Agreement and the Prospect of Commercial Exploitation of Lunar Resources*, 32 ANNALS AIR & SPACE L. 91, 109-13 (2007).