

Session 5

The Acceptability of the Moon Agreement and Road Ahead?

Back in Business? The Moon Agreement, Private Actors and Possible Commercial Exploitation of the Moon and Its Natural Resources

By

Dr. Frans G. von der Dunk*

1. Introduction

The Moon Agreement,¹ it seems, is back in business – at the very least, it is back on the table. This is the case essentially for two reasons.

On the one hand, the treaty itself was subject to increased adherence. For many years the number of ratifications had stood at nine² and there was no discernible movement amongst the five states³ that had signed it to take the next step and also ratify it. But now, with the recent ratifications by Kazakhstan (2001), Belgium (2004) and Peru (2005; finally following up on its long-time signatory status of 24 years) – an increase of 33% in partisanship in a mere five years! – the Moon Agreement appears to gain a second breath. The three recent ratifications are at least partly the consequence of an effort undertaken in the context of COPUOS to enhance the adherence to and effectiveness of all five space treaties developed in the bosom of the United Nations⁴, as initiated by a Mexican proposal in April 1997 to add a new item to the agenda of the Legal Subcommittee of COPUOS entitled “Review of the status of the five international

* Director Space Law Research, International Institute of Air and Space Law, Leiden University.

¹ Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (hereafter Moon Agreement), New York, done 18 December 1979, entered into force 11 July 1984; 1363 UNTS 3; ATS 1986 No. 14; 18 ILM 1434 (1979).

² This concerns Australia, Austria, Chile, Mexico, Morocco, the Netherlands, Pakistan, the Philippines and Uruguay. See UN document ST/SPACE/11/Rev.1/Add.1. Of those, Morocco had been the last state to ratify, in 1993.

³ This concerns France, Guatemala, India, Peru and Romania. See UN document ST/SPACE/11/Rev.1/Add.1. Of those, the last state to sign was India, in 1982.

⁴ Apart from the Moon Agreement, this of course concerns the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (hereafter Outer Space Treaty), London/Moscow/Washington, done 27 January 1967, entered into force 10 October 1967; 610 UNTS 205; TIAS 6347; 18 UST 2410; UKTS 1968 No. 10; Cmnd. 3198; ATS 1967 No. 24; 6 ILM 386 (1967); the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, London/Moscow/Washington, done 22 April 1968, entered into force 3 December 1968; 672 UNTS 119; TIAS 6599; 19 UST 7570; UKTS 1969 No. 56; Cmnd. 3786; ATS 1986 No. 8; 7 ILM 151 (1968); the Convention on International Liability for Damage Caused by Space Objects (hereafter Liability Convention), London/Moscow/Washington, done 29 March 1972, entered into force 1 September 1972; 961 UNTS 187; TIAS 7762; 24 UST 2389; UKTS 1974 No. 16; Cmnd. 5068; ATS 1975 No. 5; 10 ILM 965 (1971); and the Convention on Registration of Objects Launched into Outer Space (hereafter Registration Convention), New York, done 14 January 1975, entered into force 15 September 1976; 1023 UNTS 15; TIAS 8480; 28 UST 695; UKTS 1978 No. 70; Cmnd. 6256; ATS 1986 No. 5; 14 ILM 43 (1975).

treaties governing outer space”.⁵

On the other hand, the New Vision for Space-initiative launched by the US Administration early 2004 also rekindled the discussion on viability of the Moon Agreement and any desirability to make it work – or rather overhaul it substantively or completely – or again, even simply discard it. It offered a renewed focus of at least US government space activities on the Moon and other celestial bodies such as Mars, enjoying the same legal regime as the Moon (whether one takes the Outer Space Treaty as solely relevant or takes the Moon Agreement into account as well), and the specific role private enterprise was to play in that context. This was further borne out by discussions on the infamous lunar hoax, the so-called sale of lunar property⁶ and a rejuvenated debate on the common heritage of mankind-principle in some circles as this represented a key element of the Moon Agreement.⁷

Since this discussion paper is a lawyer’s contribution to the debate, it comes natural to start it with a couple of disclaimers. Not being a technical or economic expert, the paper is supposed not to take any position as to the likeliness or not of actual mineral resource exploitation of the Moon to take place soon, of the measure of private participation in that context, or of the measure of US leadership or dominance – following the New Vision for Space – in any such ventures. It is simply assuming that, indeed, such mineral resource exploitation is a realistic possibility, that notable private participation within that context is a distinctly possible approach, and that it is at least feasible that the United States will somehow assume a leadership role in that context.

In addition, of course, the paper would insist that from the vantage point of such distinct possibilities, it is important to scrutinise to what extent the law as it currently stands – notably, at this juncture, international space law – would still be up to the task of properly and fairly balancing the interests of all concerned in such a major, mankind-wide venture.

It will be clear then, that in this context not only the Moon Agreement, rather specific and detailed in its contents but with the drawback of meagre adherence, but also the Outer Space Treaty, as the widely accepted “Magna Charta for outer space” including a few relevant clauses for any activity on the Moon, including private and/or commercial ones, is to be tackled. The fate of the Moon Agreement, and any discussion on carrying its intended mission forward (alternatively changing its direction), cannot be seen in isolation from the regime established by the Outer Space Treaty.

2. The commercial and private potential of the Moon

⁵ See UN document A/AC.105/C.2/L.206/Rev.1, of 4 April 1997.

⁶ See e.g. Statement by the Board of Directors of the International Institute of Space Law (IISL) On Claims to Property Rights Regarding The Moon and Other Celestial Bodies, at http://www.iafastro-iisl.com/additional%20pages/Statement_Moon.htm; also F.G. von der Dunk, E. Back-Impallomeni, S. Hobe & R.M. Ramirez de Arellano, Surreal estate: addressing the issue of ‘Immovable Property Rights on the Moon’, 20 *Space Policy* (2004), 149-56.

⁷ See e.g. the relevant debate that took place within the ILA Space Law Committee; Report of the Seventieth Conference of the International Law Association, New Delhi, 2002 (2002), 192-227.

First, however, a brief survey should be made of the potential interest in the Moon from a commercial perspective, which would almost automatically bring private interest in its wake. What are those commercial and private interests about?

It is important here to define those terms in a general sense, since in particular US authors tend to use the term “commercial” where for example European authors would use the term “private”. This author, being European, will use the latter approach throughout the present discussion paper: whereas “private” refers to the (legal) classification of an actor (as opposed to “public”, comprising governments, governmental agencies and intergovernmental organisations) undertaking a space activity, “commercial” refers to the main driving factor behind, and overarching objective of, such an activity, and hence is to be contrasted to such other drivers and objectives as military or scientific purposes.

From this angle, governments or other public entities may well undertake commercial activities, also in outer space. At the same time, while “commercial” may not necessarily imply “private”, in terms of space in view of the still enormous investments required and risks involved, the other way around “private” would go seldom without “commercial”. Non-commercial private entities – e.g. scientific institutes – would not likely be able or willing yet on their own (initiative) to carry the necessary burdens coming with going into outer space, let alone to the Moon or beyond.

Amongst the space activities in general hitherto having shown to offer commercial opportunities, satellite communications undoubtedly rank first. These activities, however, usually make use either of geostationary satellites, or of low earth orbiting satellite systems. This applies also to such special, communications-related issues as the use of space navigation and surveillance for aviation (or other transport) purposes. The Moon is not very relevant from this perspective.

Vice versa, for commercial activities on the Moon obviously communications will be of major importance in many regards. In view of the distance of the Moon to the Earth this might probably require a different category of communications systems and hardware than is currently in operation, but essential “resources” for space communications such as frequencies and orbital positions or orbits would remain necessary – and their use would continue to require regulation.

This is, of course, where at the international level in particular the regime developed within the context of the International Telecommunication Union (ITU) comes in. Libraries have been written about this regime; suffice it for the present purpose to note, with an eye to the possible involvement of private and commercial entities in further activities on the Moon, that the core of the regime can be summarised as follows.

Despite some efforts to provide non-state entities (both intergovernmental organisations and private operators) a larger say in the development of the ITU legal regime, the ITU is still a classic intergovernmental organisation dominated

legally speaking by states.⁸ This is certainly also true when it comes to the complicated process in the ITU-context of trying to coordinate and regulate the use of radio frequencies as well as, in the case of satellite operations, geostationary orbital slots or non-geostationary orbits.⁹

In short, this process could be characterised as a two-step, alternatively three-step one. Actual decisions regarding the use of frequency spectrum are firstly taken at World Radio Conferences with reference to types of services – the “allocation” of frequency bands.¹⁰ “Allocation” is defined here as destining a frequency band “for the purpose of its use by one or more terrestrial or space radiocommunication services or the radio astronomy service under specified conditions”.¹¹

Secondly, states may then apply for use of frequencies (and implicitly the attendant slots or orbits). After a procedure of “advance publication”, i.e. the filing of a proposal for a satellite system and extended coordination with affected operators, “allotment” takes place of the frequencies and attendant slots or orbits. “Allotment” is defined here as the “entry of a designated frequency channel in an agreed plan, (...) for use by one or more Administrations for a terrestrial or space communication service in one or more (...) countries or (...) areas”.¹² “Administrations” in this context unambiguously refers to states.¹³ Allotment of frequencies to a specific Administration for a specific proposed satellite system then leads to inclusion in the Master Register, in theory at least guaranteeing to the intended user interference-free usage of those frequencies.

⁸ Relevant efforts resulted at the Kyoto Conference of 1994 in an amendment to Art. 19, Convention of the International Telecommunication Union (hereafter ITU Convention), Geneva, done 22 December 1992, entered into force 1 July 1994; 1825 UNTS 1; UKTS 1996 No. 24; Cm. 2539; ATS 1994 No. 28; Final Acts of the Additional Plenipotentiary Conference, Geneva, 1992 (1993), at 71; allowing for the participation of non-governmental entities as ‘small-m’ members, providing them with the right of access to all relevant information as well as consultation; and at the Minneapolis Plenipotentiary Conference of 1998 in allowing them to achieve a status of ‘Sector members’, i.e. of full-blown participation at the ITU sector level. Yet, states are still the only full members of the organisation represented on the Council; see e.g. Artt. 2, 4, ITU Convention; also Artt. 3, 8, 10, Constitution of the International Telecommunication Union (hereafter ITU Constitution), Geneva, done 22 December 1992, entered into force 1 July 1994; 1825 UNTS 1; UKTS 1996 No. 24; Cm. 2539; ATS 1994 No. 28; Final Acts of the Additional Plenipotentiary Conference, Geneva, 1992 (1993), at 1.

⁹ It should be noted that formally, for a long time, the ITU had competence only to coordinate the use of radio-frequencies; since it however soon became apparent that the risk of actual interference (a main aim for the ITU to try and prevent or minimise) depended also on the geographical location of the satellites at issue, the ITU effectively started taking those positions into consideration as well, first only for the geostationary orbit (as the main orbit of interest for a long time), then for other orbits as they became populated as well. This was ultimately reflected in Art. 44, ITU Constitution, listing radio frequencies, the geostationary and other orbits equally as limited natural resources calling for a use which should be rational, equitable, efficient and economic – with the ITU regime being tasked to realise such aims.

¹⁰ See Art. 13, ITU Constitution; Art. 7, also Art. 9, ITU Convention.

¹¹ Section 1.16, Radio Regulations.

¹² Section 1.17, Radio Regulations.

¹³ See Annex to the ITU Constitution, first bullet: “Administration: Any governmental department or service responsible for discharging the obligations undertaken in the Constitution of the International Telecommunication Union, in the Convention of the International Telecommunication Union and in the Administrative Regulations”.

If it is the state itself which will operate the satellite system thus coordinated, the process stops here, after two steps. If, however, the process concerns a satellite system to be operated by a non-state operator, whether this concerns an intergovernmental organization or a private operator, a third step is necessary: that of “assignment”.

Since neither an intergovernmental organisation nor a private operator has autonomous standing in requesting the use and coordination of frequencies (and slots or orbits), the state acting as sponsoring state of the intergovernmental organisation respectively authorising the private operator has to be allotted those. In turn, it then has to “assign” those to the intergovernmental organisation or private operator concerned. “Assignment” of a radio frequency or radio frequency channel is defined here as the “authorization given by an Administration for a radio station to use a radio frequency or by an Administration for a radio station to use a radio frequency or radio frequency channel under specified conditions”.¹⁴ As indicated, this regime would also apply for any commercial and private activities required in the context of going back to the Moon and/or beyond; at the same time, those activities do not require treatment fundamentally different from any other satellite communication activities merely because the Moon is involved.

In terms of commercial space activities in general, after satellite communications launch activities would probably rank second. There is an obvious relationship between the launch activities undertaken on Earth and the (possibilities for) commercial activities on the Moon, but the Moon does not present any particular features from the point of view of existing international launch regulation. Therefore, the main novelty of involvement of the Moon in this area would concern launches undertaken from the Moon, especially if conducted by private entities and/or for commercial purposes, that is commercial use of the Moon as a transport base, station or hub.

Once this becomes feasible, the need might indeed arise to deal with this issue and create a specific regime for those purposes. The current – rather loose – set of international rules dealing with launching have all been developed with an (at least de facto) exclusive focus on earth-based (or at best air-based) launches. For example, a “space object”, an indispensable element in triggering application of the Liability Convention, is defined effectively by means of its “launch”¹⁵ – into outer space, that is likely from the Earth or its surrounding airspace, not from outer space itself. Even the very definition of “launch” as it plays crucial roles in the definition of the liable and registration state(s) through the concept of the “launching State”, by most authors is surmised to refer only to earth- or air-based launches.¹⁶ Would or could this really mean that the regime of the Liability Convention would not, ipso facto, apply to all space objects whose launches were conducted from the Moon – for example towards Mars?

¹⁴ Section 1.18, Radio Regulations.

¹⁵ Cf. e.g. Artt. VII, VIII, Outer Space Treaty; Artt. I(d), V, Liability Convention.

¹⁶ See Art. I(c), Liability Convention, respectively Art. I(a), Registration Convention, referring to “A State from whose *territory or facility* a space object is launched” (italics added). The reference to facilities may not necessarily exclude launches for example from the Moon, but such a facility is then indeed a prerequisite for the Liability and Registration Conventions to apply.

In respect of private launches, an additional issue arises: from the perspective of the state(s) potentially held liable under the Liability Convention, such private launches would require a domestic license. However, the territorial jurisdiction usually and most conveniently exercised to enforce a licensing regime¹⁷ cannot apply to the Moon or other celestial bodies in the absence of applicability of any territorial sovereignty on those celestial bodies, as will be detailed further below.

The third activity usually discussed in the context of commercialisation of space concerns remote sensing (or Earth observation, the – slightly more restricted – term which is often used in the alternative). It seems, however, that the Moon does not feature with any preponderance in this respect. Neither remote sensing from the Moon (because of the distance Moon-Earth), nor remote sensing of the Moon (in view in particular of the lack of sensed states and sensed populations) seem to be issues for discussion for the present purpose.

Other possibly interesting activities, with only a remote commercial perspective, concern the use of space (including in principle the Moon) for manufacturing or producing items where the (near) weightlessness of outer space would present major advantages. An obvious example concerns special medicinal products. The complications arising from the efforts to (partly) commercialise utilisation of the International Space Station however make clear that commercial activities in this domain are not directly around the corner.¹⁸ It should be noted, moreover, that the Moon offers only reduced gravitation (about 1/6th of terrestrial gravitation), rather than (near) weightlessness.

It is, consequently, the exploitation of natural resources which calls for immediate attention most prominently. Not accidentally, therefore, have the discussions on desirability and viability of the Moon Agreement or an alternative regime essentially centred around this issue, as will be elaborated further below. The contrast between the Moon (and other celestial bodies) as a piece of hard rock being of a very physical nature, and the rest of space as a void presenting the best opportunities for usage mainly in terms of being an area for placement (of satellites and space stations) or transit (of communication beams, remotely sensed waves or launched hardware) is no doubt a major reason behind this fact.

The Moon, from a commercial perspective, has thus been envisaged mainly as a source of (potentially) valuable minerals and metals. Neglecting for a moment the question as to the immanency, mining of the Moon therefore also presents the most directly interesting potential commercial usage of the Moon to be dealt

¹⁷ Cf. e.g. for the United States Sec. 6(a)(1), Commercial Space Launch Act, Public Law 98-575, 98th Congress, H.R. 3942, 30 October 1984; 98 Stat. 3055; Space Law – Basic Legal Documents, E.III.3; for Sweden Sec. 2, Act on Space Activities, 1982: 963, 18 November 1982; National Space Legislation of the World, Vol. I (2001), at 398; Space Law – Basic Legal Documents, E.II.1; 36 ZLW (1987), at 11; for the Russian Federation Art. 9(2), Law of the Russian Federation on Space Activities, No. 5663-1, 20 August 1993, effective 6 October 1993; National Space Legislation of the World, Vol. I (2001), at 101; for South Africa Sec. 11(1)(a), Space Affairs Act, 6 September 1993, assented to on 23 June 1993, No. 84 of 1993; Statutes of the Republic of South Africa – Trade and Industry, Issue No. 27, 21-44; National Space Legislation of the World, Vol. I (2001), at 413; and for Australia Sec. 11, An act about space activities, and for related purposes, No. 123 of 1998, assented to 21 December 1998; National Space Legislation of the World, Vol. I (2001), at 197.

¹⁸ Cf. e.g. F.G. von der Dunk & M.M.T.A. Brus (Eds.), *The International Space Station – Commercial Utilisation from a European Legal Perspective* (2006).

with in law. Any discussion on such regulation thereof, moreover, will (have to) make reference to, and take account of, other areas where mining under exceptional circumstances has become an issue or even a fact – notably Antarctica and the ocean floor.

3. The status of the Moon: international law and the Outer Space Treaty

When, indeed, mineral and other natural resource-exploitation will provide the main focus for the foreseeable time for any commercial and private interest in the Moon, the issue of the status of the Moon from a territorial perspective immediately becomes important with it. Though it is clear that territorial sovereignty, or even private ownership, of (a part of) the Moon would not per se be required for a legally balanced and efficient regime of natural resource-exploitation – on the high seas, fishing has thrived for centuries in the absence of any “territorial” sovereignty¹⁹ – from the other end clarity on the (“territorial”) status of the Moon would certainly be requisite. This, of necessity, requires amongst others revisiting the long and heated debates about such fundamental concepts as the common heritage of mankind.

In the Outer Space Treaty, Article II as the most fundamental legal provision specifies the particular application of the very general principles regarding sovereignty to outer space. It provides in rather unequivocal fashion that “outer 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”.

This clause is widely perceived to exclude the applicability of territorial sovereignty to outer space or any particular part thereof.²⁰ In other words: outer space does not form part of any state’s territory, as legally defined for purposes of the scope of its sovereign authority. Neither can it ever become part of such a national territory: outer space is not *res nullius* or *terra nullius*, and is not susceptible to legal occupation, conquest or cession.²¹ This as such obviously also applies to the Moon, being part of outer space. Under present international legal doctrine, this would still leave open two options as to the status of outer space, including the Moon.

As to the first such option, already in the times of Hugo Grotius it had been recognised that certain geographical areas were in a very principled sense outside the reach of any state’s territorial sovereignty as *terra communis*. Following from the foregoing brief analysis of Article II of the Outer Space Treaty, outer space indeed would qualify as such a *terra communis* or *res extra commercium*, a geographically defined area where freedom rules in principle just like on the high seas.²² Only the states of the world acting collectively can

¹⁹ See further on this issue e.g. H.R. Hertzfeld & F.G. von der Dunk, *Bringing Space Law into the Commercial World: Property Rights without Sovereignty*, 6 *Chicago Journal of International Law* (2005), 81-99.

²⁰ See extensively already e.g. M. Lachs, *The Law of Outer Space* (1972), 42-8; S. Gorove, *Developments in Space Law* (1991), 25-6.

²¹ See for the concept of *res nullius* e.g. I. Brownlie, *Principles of Public International Law* (3rd ed.) (1979), 109, 180-1.

²² See on *terra communis* and *res communis* e.g. Brownlie, 181, 266-70; N. Singh, *Introduction to*

provide for legal conditions to any activity in this area: no individual state could call the tune to which other states or their entities would have to dance, not even for a part of that area such as the Moon. Vice versa, each state (or its entities) could equally profit from that fundamental freedom, without hindrance from any particular rival state.

The application of this notion to outer space is further supported by such provisions in the Outer Space Treaty as the ones regarding the freedom of exploration and use of, and of scientific investigation in outer space.²³ It also arises out of the general character of the Outer Space Treaty as providing the legal framework for all activities in outer space.²⁴ The Outer Space Treaty itself provides for the application of international law in general to outer space,²⁵ as well as for some of the most important restrictions to the fundamental freedom of space activities.²⁶

It thereby makes clear that, indeed, only the community of states can establish the legal regime for outer space in principalem, while at the same time, to the extent such a regime is not in place, the freedom of space activities remains. Individual states furthermore – and in consequence – are directly held accountable for their activities (or those of their entities) towards other states by means of the principles of international responsibility and international liability.²⁷

Analysis could have stopped here, were it not that the space treaties themselves introduced further important concepts, somewhat complicating or even redefining the application of the terra communis concept to outer space. The Outer Space Treaty most prominently came up with the hitherto unknown phrase “province of all mankind” as “defining” the “status” of exploration and use (of which more below).²⁸ In addition, a further, more general and substantive theoretical option for defining the status of an area like outer space, of specific importance in the context of the Moon, had meanwhile entered the international legal discussion: that of the common heritage of mankind. Its application to specific (categories of) geographical areas, and its exact contents and consequences remain the topic of intensive debate.²⁹ The principle as such however may be said to have achieved a measure of acceptance by now.

International Law of the Sea and International Space Law, in M. Bedjaoui (Ed.), *International Law: Achievements and Prospects* (1991), 825 ff.; V.F. Wodié, *The High Seas*, in M. Bedjaoui (Ed.), *International Law: Achievements and Prospects* (1991), 887 ff.; also Art. 2, Convention on the High Seas, Geneva, done 29 April 1958, entered into force 30 September 1962; 450 UNTS 82; TIAS 5200; 13 UST 2312; Artt. 87, 89, United Nations Convention on the Law of the Sea, Montego Bay, done 30 April 1982, entered into force 16 November 1994; 21 ILM 1261 (1982).

²³ See Art. I, Outer Space Treaty.

²⁴ Cf. e.g. C.Q. Christol, *The Modern International Law of Outer Space* (1982), 12, 20; S. Gorove, *Sources and Principles of Space Law*, in N. Jasentulyana (Ed.), *Space Law – Development and Scope* (1992), 46-7.

²⁵ See Art. III, Outer Space Treaty.

²⁶ One important example thereof concerns the limitations to military and/or non-peaceful uses of outer space as provided by Art. IV, Outer Space Treaty.

²⁷ See Artt. VI resp. VII, Outer Space Treaty.

²⁸ Art. I, Outer Space Treaty.

²⁹ Cf. e.g. A.A. Cocca, *Property Rights on the Moon and Celestial Bodies*, in *Proceedings of the Thirty-Ninth Colloquium on the Law of Outer Space* (1996), 9-19.

It was most intensively discussed with respect to the status of the ocean floor in the framework of the United Nations Conference on the Law of the Sea, taking place from 1974 till 1982.³⁰ The core issue in the eyes of the proponents of applicability of the common heritage of mankind-principle to the ocean floor amounted to one crucial step beyond the recognition of the terra communis-status (which the opponents clung to).

The “classical” terra communis went with the presumption of complete freedom of activities unless the contrary could be proven.³¹ Those pronouncing the ocean floor the common heritage of mankind on the contrary presumed that any substantial – especially commercial – exploitative activities essentially required the consent of the community of states. Consequently, they proposed to establish an international body to preserve such rights of the world community and act as a caretaker.³² Individual states (or their private entities) should only be allowed to undertake commercial activities as long as this caretaker would see to it that all states, especially the developing countries, would actually and materially benefit from those activities.

Coming back to outer space (law) in general, several traces of this common heritage of mankind-principle had already found their way into the Outer Space Treaty, that is even before the UN Conference on the Law of the Sea had formally minted the term itself. The “common interest of all mankind” and the “benefit of all peoples” are major principles guiding the exploration and use of outer space.³³ Furthermore, in its very first sentence, the Outer Space Treaty had provided that the exploration and use of outer space “shall be carried out for the benefit and in the interests of all countries”.³⁴ Finally, as referred to, it coined the concept of the “province of all mankind”. As a consequence, certain circles arrived at a short-cut conclusion determining outer space to be the common heritage of mankind without further ado.

However, while the concept of the province of all mankind indeed seems to echo the common heritage of mankind-principle, most authors as well as the most important space faring states agree that its usage in the Outer Space Treaty denies rather than confirms any perceived status of outer space as common heritage of mankind.³⁵

Back to the seas for a moment, in order to see what the common heritage of mankind would or at least could amount to in more detail. At the UN Conference on the Law of the Sea, application of the common heritage of mankind-principle to the ocean floor had taken the form of a rather explicit arrangement regarding any prospective commercial activities in that area.³⁶ An international body, the Seabed Authority, was foreseen to license such

³⁰ See also Artt. 136, 137, United Nations Convention on the Law of the Sea.

³¹ Cf. e.g. Art. 87(1), United Nations Convention on the Law of the Sea, providing the general rule of freedom, and e.g. Artt. 87(2), 88, 89, as providing exceptions thereto.

³² Cf. esp. Art. 137(2), United Nations Convention on the Law of the Sea.

³³ Preamble, Outer Space Treaty.

³⁴ Art. I, Outer Space Treaty.

³⁵ Cf. e.g. Christol, 252, ff.

³⁶ See Artt. 150 ff., United Nations Convention on the Law of the Sea.

exploitation activities. It should, moreover, license them only under conditions which would allow the other states of the world community – especially the developing ones – to materially profit from any particular licensed activity as well. An international enterprise was to actually undertake exploitation activities of the ocean floor on their behalf. Such bodies of course were not at all established by the Outer Space Treaty, and, at that point, certainly not even foreseen by the states involved.³⁷

Consequently, at the end of the day the provision regarding the “benefit and (...) interest of all countries” in the Outer Space Treaty should only be interpreted in a “negative” way.³⁸ As long as a particular activity in outer space did not (significantly) harm another state, it would be allowable under the fundamental freedom of space activity. No “positive” material benefits accruing to other states were required to make any exploitation of outer space legal.

The only difference of the status of outer space with the traditional formulation of terra or *res communis* would consequently be that, this time, the obligation not to cause significant harm was explicitly included. This, however, should be considered as being of marginal importance from a conceptual point of view. The status of outer space should therefore be generally equated to terra or *res communis*, notwithstanding the rise to prominence of the common heritage of mankind-concept in the law of the sea.

These conclusions so far would also apply to the Moon, as one specific area within the larger area of outer space. The Outer Space Treaty does make an important distinction between the Moon (and other celestial bodies) on the one hand, and outer space in general on the other hand; but this only concerns the stricter regime established in respect of the former when it comes to military or similar activities.³⁹ This therefore seems to be of little consequence for the present analysis of the overarching legal status of the Moon or other celestial bodies.

More interestingly, “all stations, installations, equipment and space vehicles on the moon and other celestial bodies shall be open to representatives of other States Parties to the Treaty”.⁴⁰ The impact of this clause is somewhat mitigated by conditions, the most important one that being of reciprocity. Nevertheless, in principle an obligatory openness to prying eyes results and to that extent full and uninhibited enjoyment of the ownership of hardware, software and know-how, whether by public or by private entities, simply does not exist on the Moon. In the last instance, however, even this interesting clause does not in any way result

³⁷ This arose only at the discussions regarding the Moon Agreement to be established; see e.g. Christol, 286 ff.

³⁸ Art. IX, Outer Space Treaty, effectively had exactly that effect, by providing *inter alia* for duties of a due care-character in respect of activities in outer space, and consultation. Much later, the Benefits Declaration would add considerable fuel to such an interpretation; Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of all States, Taking into Particular Account the Needs of Developing Countries, UNGA Res. 51/122, of 13 December 1996; XXII-I Annals of Air and Space Law (1997), at 556; 46 ZLW (1997), at 236. See also e.g. M. Benkö & K.U. Schrogl, The United Nations Committee on the Peaceful Uses of Outer Space: Adoption of a Declaration on ‘Space Benefits’ and other Recent Development, 46 ZLW (1997), 228-35.

³⁹ See Art. IV, Outer Space Treaty.

⁴⁰ Art. XII, Outer Space Treaty.

in the Moon being the common heritage of mankind under the Outer Space Treaty.

4. The Moon Agreement on status issues: elaborating the Outer Space Treaty?

Whilst the Outer Space Treaty is globally applicable, it is also rather general in providing essentially for clues to the legal status to the Moon, as opposed to specific guidance on issues of natural resource (or other) exploitation of the Moon. Also, apart from the general principles regarding state responsibility (including for private activities) and state liability (including for privately-caused harm), the Outer Space Treaty does not offer detailed provisions on the involvement of private entities in space activities. For those reasons, even in the absence of widespread ratification of the Moon Agreement, it is appropriate now to start looking at what this most recent of the five UN space treaties does provide by way of legal regime – if only, since in a number of respects the Moon Agreement has the potential to qualify as an elaboration of the Outer Space Treaty.

The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, better known under its colloquial name 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. As indicated, the Moon Agreement had been ratified by now twelve states, whilst a further four states are signatories to it. This rather meagre measure of acceptance, as will be discussed briefly further below, makes it difficult to argue any binding force of the rules provided by it without further ado outside of the small circle of the aforementioned states; therefore, analysing these rules for example as to their legal status requires special care.

The Moon Agreement however does constitute an elaboration of the Outer Space Treaty to the extent of detailing the latter's fundamental rules with respect to the Moon and other celestial bodies in the solar system. As noted, the Moon and other celestial bodies as immense and permanent pieces of hard rock form special areas within outer space as a whole, which makes the establishment of a special regime very sensible. Thus, whilst the Moon Agreement carries relatively marginal support, it is still the best place to start analysis for the purpose of development of any regime for commercial and private exploitation of the Moon and its natural resources.

According to its Preamble, the establishment of the Moon Agreement further was the consequence of the possibilities to exploit and use the Moon in a commercial or near-commercial fashion, which seemed to be feasible in the not-too-distant future. Thus, it embodied a desire to provide for a peaceful, orderly and fair regime especially for such exploitation and use of the Moon and its natural resources, with a particular view to the interests of less-developed states. As a consequence, the issue of commercial space activities, and further to that, of private involvement therein, was of special importance in the case of the Moon Agreement as it were from the start.

Starting once more with the overarching issue of legal status, a number of provisions in the Moon Agreement directly or indirectly affect the international

status of the Moon. The Moon Agreement in many of these provisions essentially follows the Outer Space Treaty as far as the terra communis-character of the Moon is concerned. To begin with, repeatedly reference is made directly to the Outer Space Treaty as such.⁴¹ The Moon Agreement attempts here to itself establish the conditions under which the (otherwise free) exploration or use of the Moon, in conformity with the Outer Space Treaty, may be conducted.⁴² It does not allow for national appropriation of (a part of) the Moon, nor does it allow any individual state to call the tune in that respect.⁴³

Furthermore, mention is made of the “corresponding interests of all other States Parties” in “promoting international cooperation and mutual understanding”, which activities on the Moon shall take due account of.⁴⁴ This echoes the Outer Space Treaty’s Article IX. In view of the limited number of parties to the Moon Agreement, however, the fact that the duty to respect corresponding interests is by definition formally confined to other parties to the Agreement takes on much more significance here. This provides further proof for the contention that the Moon is not generally considered the common heritage of mankind: “common” here effectively refers only to the twelve states parties, not to “mankind” as a whole; it is only their interests any other state party has to take into account.

Consequently, it is of much greater significance that the Moon Agreement echoes the first part of Article I of the Outer Space Treaty in stating that the exploration and use of the Moon constitute the “province of all mankind”, which qualification can therefore be considered to be generally accepted also for the Moon.⁴⁵ Actually, the phrase “province of all mankind”, as applicable to exploration and use, in the Moon Agreement is moved to the first part of the sentence, thus giving it greater emphasis. While repeating the partial explanation of the notion by means of “the benefit and (...) interest of all countries”, the Moon Agreement then adds further precision: “due regard shall be paid to the interests of present and future generations as well as to the need to promote higher standards of living and conditions of economic and social progress and development”.⁴⁶ The first part foreshadows the recent discussions regarding “sustainable development”; while the second part tastes of the inter-state solidarity which had been largely responsible for the development of the common heritage of mankind-doctrine – but cannot as such be equated to that concept. No specifics beyond the “due regard” to “be paid” to those needs are provided.

Thus, it can not be concluded that the exploration and use of the Moon should be considered the common heritage of mankind even by the states parties to the Moon Agreement. No specific instruments or mechanisms are defined by these provisions – as was, by contrast, done in the UN Convention on the Law of the Sea – to ensure that all states, especially the developing ones, benefit from any material exploratory activities on or utilisation of the Moon. Rather than an absolute obligation to achieve a particular result, it constitutes an obligation to

⁴¹ See Preamble, Artt. 9(2), 10(1), 14(2), 16, Moon Agreement.

⁴² Cf. e.g. Artt. 2, 3, Moon Agreement.

⁴³ See Art. 11(2), Moon Agreement.

⁴⁴ Art. 2, Moon Agreement.

⁴⁵ See Art. 4(1), Moon Agreement.

⁴⁶ Art. 4(1), Moon Agreement.

undertake a certain effort, an obligation of good faith which may be overruled by other circumstances.

Related provisions, such as the one providing for guidance of states in their exploration and use “by the principle of cooperation and mutual assistance”, or the one providing for obligations to inform other states in relevant cases “to the greatest extent feasible and practicable”, confirm this analysis.⁴⁷ Also, the freedom of scientific investigation as a form of exploration, already provided for by the Outer Space Treaty in its Article I, is reaffirmed with respect to the specific case of the Moon (and the other celestial bodies).⁴⁸ Finally, no convincing reason has been put forward for using two different phrases in the same treaty when supposedly reference is to be had to the same principle – by the time the Moon Agreement came around, the UN Conference on the Law of the Sea had already officially minted the concept of the common heritage of mankind.

All in all, the exploration and use of the Moon, as province of all mankind, is essentially *res communis* rather than common heritage of mankind even under the Moon Agreement. From this, it would follow that it was largely the uncertainty in this respect engendered by those clamouring that the province of all mankind-principle was essentially similar to the common heritage of mankind-principle as it was being elaborated in the law of the sea-context that kept many – most – states from signing and ratifying the Moon Agreement.

There is, however, the undeniable fact that Article 11 of the Moon Agreement, forming the core provision in this respect, provides that “the moon and its natural resources are the common heritage of mankind”⁴⁹, though it has not indicated what the practical consequences thereof were or should be. Neither has Article 11, thereby, itself clarified the boundaries between, on the one hand, exploration and use of the Moon and, on the other hand, the Moon itself as well as its natural resources, which did not help much either. If natural resources should be understood, as common heritage of mankind, not to be subject to individual state’s decisions, would there be any meaning left in the fact that the use thereof would be considered the province of all mankind – or the other way around? Is “exploitation” a category distinct from “use” then, which (at least with respect to the Outer Space Treaty) most experts would not hold to be the case, since under such an approach the latter treaty would not regulate exploitation at all?

This would mean, in turn, that once such uncertainties and contradictory claims would be removed, the Moon Agreement might be back in business again. In other words: delete the principle of the common heritage of mankind altogether from the treaty, dispelling any such uncertainties! Alternatively if, even in spite of an ear-shattering silence from all but a handful of states when it came to signing or ratifying the Moon Agreement which proclaims the concept so loudly, the concept is still so dear to so many that such deletion is unthinkable, at least its contents should unambiguously and fundamentally be altered from what

⁴⁷ Resp. Art. 4(2) and Art. 5, Moon Agreement; note the qualification of any substantial duty by the use of the terms “guided” resp. “feasible and practicable”.

⁴⁸ See Art. 6, Moon Agreement.

⁴⁹ Art. 11(1), Moon Agreement.

these would currently be perceived to be.

Before taking such a conclusion for granted however, it is important to discuss the impact from this perspective of the essential difference between the Moon Agreement and the Outer Space Treaty. The latter treaty, as established, deals with the whole area of outer space, alternatively with specific sorts of activities taking place therein. This concerns exploration (including for this purpose scientific investigation) and use; leaving aside the special issue of military activities, these two categories together more or less comprise all activities envisaged in outer space at least as far as the Outer Space Treaty is concerned.⁵⁰ The rules specifically devised for one or both of these categories (usually exploration and use are dealt with in combination), as implied above, do further substantiate the conclusion that outer space as an area in the legal sense of the word constitutes *res* or *terra communis*.

The Moon Agreement, however, specifically dealing with tangible *res*, read *terra*, such as the Moon and the other celestial bodies, was bound to envisage a third category of activities: that of physical exploitation. It is thus that Articles 4 and 11 create a dichotomy between the status of the exploration and use, and by analogy of scientific investigation, on the one hand, and the exploitation of the natural resources and the status of the Moon as a whole on the other hand. As seen, the former remains the province of all mankind, previously argued to be a kind of *res communis*-status with the addition of explicit provisions regarding the obligation not to cause significant harm.

As discussed also, at the same time the natural resources of the Moon are explicitly defined as the common heritage of mankind – which already indicates that any exploitation thereof would also have to be dealt with under that concept, as had been the case in the law of the sea. That, however, in turn would mean that “use” and “exploitation”, at least to that extent, would constitute mutually exclusive concepts, rather than the one including the other.⁵¹ The essence of the application of the principle is then further elaborated upon: “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 other entity undertaking activities on the Moon.⁵² An “international regime, including appropriate procedures” is furthermore to be established, as soon as relevant, “to govern the exploitation of the natural resources of the Moon”.⁵³ This international regime finally should *inter alia* guarantee “an equitable sharing by all States Parties 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

⁵⁰ Cf. e.g. Artt. I, III, IX, Outer Space Treaty.

⁵¹ The Moon Agreement itself follows that approach also in Article 11, where para. (4) deals with “exploration and use” (which states parties have the right to undertake, as long as in a non-discriminatory and equitable fashion, and in accordance with international law) and para. (5) deals with “exploitation of the natural resources” (which states parties would only have the right to undertake in the context of an international regime to be established in the future).

⁵² Art. 11(3), Moon Agreement.

⁵³ Art. 11(5), Moon Agreement. See also Art. 18. This obviously echoes the relevant provisions of the United Nations Convention on the Law of the Sea.

consideration”.⁵⁴

The application of the common heritage of mankind-principle under the Moon Agreement to the natural resources of the Moon in the abstract sense is clear and unambiguous (and its application to exploitation thereof would seem to follow therefrom) – even if it only applies in full, as yet, to twelve states, none of which harbour immediate plans or capabilities to actually start exploitation of lunar natural resources, let alone that they currently host private companies able or willing to do so. The inclusion of the Moon as such in this principle, however, is emptied of all meaning beyond such exploitation in view of the other categories of activities envisaged. Neither exploration nor use, nor specifically scientific investigation could be considered common heritage of mankind even under the terms of the Moon Agreement. The freedom of exploration and use of the Moon is reconfirmed also by Article 11 itself, while the freedom of scientific investigation is equally reconfirmed.⁵⁵

In sum, even under the Moon Agreement the Moon does not have a status as either comprehensively being *res communis* or comprehensively being common heritage of mankind. While exploration, use and scientific investigation fall under the former categorisation, exploitation of natural resources falls under the latter one. To that extent, the Moon Agreement fundamentally differs from the Outer Space Treaty as far as relevant for the Moon and other celestial bodies.

5. The Moon Agreement and private and commercial activities

If, in spite of the above, the Moon Agreement is to be granted a new lease on life, for reasons that it would still seem to be the only feasible existing starting point for discussion and establishment of a fair, efficient and transparent international legal regime for any exploitation of lunar resources, the next subject for analysis would be the extent to which the Moon Agreement offers clauses more specifically dealing with such exploitation. Such further general clauses contained in the Moon Agreement indirectly relevant for the present analysis on private and commercial activities on the Moon (whether they constitute “use” or “exploitation”) would be the following.

Firstly, Article 9 already gives some clue as to how “province of all mankind” and “common heritage of mankind” should be interpreted, as it unequivocally establishes the freedom of establishing manned and unmanned stations on the Moon, as long as the freedom of access to all areas of the Moon is not unduly obstructed thereby. So freedom is indeed the point of departure here, one freedom at the principal level only to be limited by the need to preserve another freedom.

Secondly, Article 12 reiterates the general provisions of the Outer Space Treaty’s Article VIII and its elaboration by means of the Registration Convention. States retain jurisdiction and control over their personnel and any relevant hardware. This provision is important in that it offers, in the absence of proper territorial sovereignty and jurisdiction, individual states an alternative legal means to

⁵⁴ Art. 11(7(d)), Moon Agreement. Again, this echoes particular clauses of the United Nations Convention on the Law of the Sea.

⁵⁵ Art. 11(4), resp. Artt. 6 and (implicitly) 11(7(d)), Moon Agreement.

regulate certain categories of private commercial activities, whether for the purpose of implementation of rules of public international space law or in pursuance of the interests of that particular state.

Thirdly and similarly, Article 14 harks back to the general provision of Articles VI and VII of the Outer Space Treaty and the Liability Convention. States shall bear international responsibility for “national activities” (whatever the exact contents of that phrase) on the Moon, when it comes to the conformity of such activities with international law, and shall bear international liability in conformity with the relevant provisions of the international space treaties referred to, to the extent necessary as elaborated further by detailed arrangements. These provisions basically ensure that states can be held accountable on the international level for certain categories of private commercial activities also on the Moon. For which categories exactly a certain state would be held responsible respectively liable, would still be a matter for debate, however, even if these issues are not to be solved here and now.⁵⁶

The Moon Agreement furthermore harbours a number of specific provisions directly important for the present issue, even though nowhere explicit reference is made to the term “commercial (space activities)”.⁵⁷ In the absence of such explicit references, however, the frequent references to “exploitation (of natural resources)” and “use” are notable. Leaving aside at this point the discussion as to the precise meaning of these two terms and their conceptual relationship that has been touched upon before (are they two alternative concepts, or is “exploitation” a sub-category of “use”?), it becomes clear already when looking at the context in which the Moon Agreement was drafted (as referred to above) that “commercial exploitation” and “commercial use” form prominent manifestations of “exploitation” and “use” respectively.

A summary overview of the Moon Agreement presents the following references to these two core notions of “use” and “exploitation”.

First, the Preamble makes reference to the achievements in the use of the Moon, and to further progress in such use and the need to deal with it by means of legal provisions, as well as to the potential benefits to be derived from the exploitation of the Moon’s natural resources.

Second, under Article 2, all activities on the Moon (explicitly including use, implicitly also exploitation) should be in conformity with international law, and shall be undertaken with due respect for the interests of all states.⁵⁸

Third, Article 4 as discussed provides for the fundamental provision that the exploration and use of the Moon shall be the province of all mankind. Once more, the major question has to be tackled: if, in general terms, “province of all mankind” is an elaboration of the traditional *terra communis/res communis*-concept, does that not imply that such activities are allowed in principle until a

⁵⁶ See for a general discussion thereof e.g. the author’s *Private Enterprise and Public Interest in the European ‘Spacescape’* (1998), 17-26.

⁵⁷ That, it may be noted, also applies to the Outer Space Treaty and the other Un space treaties.

⁵⁸ This, of course, reiterates Arts. III, resp. I, Outer Space Treaty.

prohibition can be distilled or discerned, or are they somehow still prohibited until unequivocally allowed, most probably then under certain conditions only? Is “exploitation” part of “use”, or something else entirely?

Fourth, according to Article 5 states have the duty to provide relevant information as regards their activities undertaken in using the Moon.⁵⁹ This provision is mainly targeted at possible harmful consequences of such activities in terms of the environment.⁶⁰ Certainly, here it would make little sense to exclude “exploitation” from this provision as it applies to “use”, if this provision is to have any effective protective effect with regard to the environment. Interpreted in this sense, it would merely reflect – and hence reconfirm – the interpretation of “province of all mankind” as a *res* or *terra communis*, with due consequences to rights to, for example, use and/or exploitation.

Fifth, further to Article 5 above Article 7 provides that states shall take measures destined to keep the harmful consequences of their use of the Moon to a certain minimum. Also this clause reflects *res communis* much more than it would any feasible manifestation of the common heritage of mankind-concept, representing as it does a duty to abstain from certain activities in the context of, for instance, exploitation rather than a requirement for positive action.

Sixth, the Moon Agreement determines that states basically are free in using the Moon, including its sub-surface.⁶¹ Such a provision would sit ill with any application of the common heritage of mankind-concept, at least to the extent that it would indeed tend to follow the 1982-version of the UN Convention on the Law of the Sea and the foreseen ways of implementing the concept in that context.

Seventh, as discussed, of course Article 11 is of fundamental importance in the whole discussion on lunar exploitation and commercial activities, as the Moon and its natural resources are proclaimed common heritage of mankind, which means *inter alia* that establishment of an international regime in accordance with Article 18, for the exploitation of such natural resources, taking into account especially the interests and needs of the developing countries, will be required. Major issues for debate presented by these provisions are whether this implies a moratorium on exploitation until such a regime is in place; where exactly the borderline of application between Articles 8 and 11 lies; and what the relevance of these provisions is in the light of the relatively meagre measure of ratification of the Moon Agreement.

Eighth and finally, the Moon Agreement states that in using the Moon, states have certain rights to monitor compliance of other states’ activities (and those of their entities) with the provisions of the Moon Agreement, and vice versa certain duties to inform and consult other states.⁶²

⁵⁹ This duty refers to both the UN Secretary-General, and the public and international scientific community.

⁶⁰ Cf. Art. 5(3), Moon Agreement.

⁶¹ See Art. 8, Moon Agreement.

⁶² See Art. 15, Moon Agreement.

6. The future of the Moon Agreement in view of potential exploitation

It is clear from the above analyses that there is no coherent and dedicated regime applicable to commercial and private exploitation of lunar resources to be found currently, neither in the Outer Space Treaty nor even in the Moon Agreement. The latter does provide for a number of important parameters, but this still does not itself amount to a sufficiently coherent and detailed regime.

In particular furthermore, it should be reiterated that specifically the still-limited adherence to the Moon Agreement calls into question what the relevance of each of its provisions is anyway, in light of the fact that some provisions seem to be mere elaborations of the Outer Space Treaty whereas others seem to go much further. Especially the absence of applicability of certain of the Moon Agreement's provisions (such as those regarding the exploitation of its natural resources of Article 11) calls for an analysis whether a gap would result in legal terms: is exploitation allowable until explicitly prohibited, or is it prohibited until explicitly allowed?

The terminology of the Moon Agreement in this respect itself perhaps may suggest that the common heritage of mankind provides a kind of objective legal regime (or at least the foundations thereof), that is determining the Moon's legal status not only as amongst parties, but as binding upon the entire community of states.⁶³ Such a suggestion should, however, be dismissed already on the account of the fact that, under the Moon Agreement, a mere five ratifications – a rather minute figure for a treaty open to all member states of the United Nations – sufficed for causing the treaty to enter into force:⁶⁴ surely, a discretionary combination of only five states could not have been envisaged to be allowed to determine for all states the status of the Moon and other celestial bodies. Moreover, such contention can be upheld with even more difficulty in face of the fact that the overwhelming majority of states have refused to ratify the Moon Agreement, to a considerable extent precisely because of the common heritage of mankind-principle – and those states include all major space-faring nations. As a consequence, also, any analogy with Antarctica does not hold here, since the Antarctic Treaty⁶⁵ regime does include all the major state actors with respect to Antarctica, and the general thrust of the rules developed in its context has been accepted also by non-parties to the Antarctic Treaty and later relevant treaties and protocols.

Actually, of course, the Moon Agreement acknowledges this itself by its key Article 11(5), providing for the need of establishment of “an international regime, including appropriate procedures, to govern the exploitation of the natural resources of the moon as such exploitation is about to become feasible”. It seems, with the developments referred to in the Introduction above and in particular the New Vision for Space, that now is indeed the moment to start thinking about such a regime – and thus perhaps, indeed, bring the Moon Agreement back into business.

⁶³ Cf. the precise phrasing of Art. 11(1), Moon Agreement.

⁶⁴ See Art. 19(3), Moon Agreement.

⁶⁵ Antarctic Treaty, Washington, done 1 December 1959, entered into force 23 June 1961; 402 UNTS 71; TIAS 4780; 12 USI 794; UKTS 1961 No. 97; Cmnd. 913; ATS 1961 No. 12.

The first thing to be done then, obviously, is to further analyse the main gaps that the current “regime” under the Moon Agreement shows. In this context, from the foregoing a number of issues arise, where (apparent) gaps arise that do require further analysis and discussion. A few problematic aspects have already been touched upon before, for example in dealing with the provisions of Articles 4, 11 and 14 of the Moon Agreement. From a more general and structural perspective, the following issues would also rise to prominence and deserve attention for the present purpose. To start with, there are two issues of a more general, abstract nature to be taken into consideration here, even if this is not the place (nor the time) to (try to) solve them.

Firstly, the absence of any elaborated liability regime as envisaged⁶⁶ calls for scrutiny of the general space law liability regime (as it arises mainly from the Liability Convention) and how it would or could cope with the specific characteristics of such activities as mining on the Moon, which may give rise to quite distinct types of damage when compared to the “traditional” types of damage dealt with by the Liability Convention. Already the application of the Liability Convention only to damage caused by “space objects”, as discussed before, may turn out to severely limit the effectiveness of that regime to mining activities on the Moon.⁶⁷

Secondly, the uncertainty surrounding the definition of “national activities” as the category of activities for which a state may be held internationally responsible and which it should consequently “authorise” and “continuously supervise”⁶⁸ may lead to uncertainty as to which state should regulate which private activities on the Moon. Likewise, the uncertainty as to whether and under which criteria a state would qualify as a launching state for purposes of international liability also in cases of private activities⁶⁹, may lead to gaps (and overlaps) in national regulatory measures pertaining to any commercial activities on the Moon.

The next – and main – point of attention, of necessity, concerns the limited measure of ratification, in spite of the recent growth by 33%. The arguments in favour of a specific regime for the Moon and other celestial bodies, after all, do still remain valid. So, discussion here fundamentally turns around the question whether in the end a fair, balanced and workable (and hopefully rather uniform) body of international legal rules applicable to the Moon might best be served by re-interpretation or even amendment of the Moon Agreement, alternatively by discarding it and replacing it with an alternative Agreement better able to achieve a large measure of consensus amongst the world’s states.

This requires an analysis of the background to the Moon Agreement’s poorly-ratified status. Here, the fact that immediately catches the eye is that both the large majority of industrialised nations and the large majority of Third World

⁶⁶ See Artt. 11, 18, Moon Agreement.

⁶⁷ If ‘space objects’ are only those man-made objects launched or intended to be launched into outer space, any moon-made ‘object’ used for mining activities, as well as any mined material, would not seem to fall within such a definition and hence might lead to non-applicability of the Liability Convention in case these cause damage.

⁶⁸ See Art. VI, Outer Space Treaty.

⁶⁹ See Art. VII, Outer Space Treaty, and the Liability Convention.

nations are not amongst the parties to the Moon Agreement.

The absence of many states from the former category amongst the parties would have been expected. There is a clear assumption regarding the tendency of the Moon Agreement to preclude unobstructed private and commercial exploitation of the Moon's resources because of, and by means of, the common heritage of mankind-principle. Certainly under the then-prevailing political climate, the application of that principle suggested that whatever its detailed elaboration, two main contentious elements would be very likely to be incorporated: mandatory transfer of technology as well as mandatory transfer of material benefits from any exploitative activities on the Moon by those undertaking them to, in particular, developing states not necessarily themselves participating in any sense in the activities concerned (because of a lack of financial and technical opportunities).

But for precisely that last reason the absence of many states from the latter category is quite surprising. As any effective application of the common heritage of mankind-principle to the Moon would likely result in a relatively beneficial position for the developing states at large (certainly as long as these are also non-spacefaring), at least under the law, their almost comprehensive absence amongst parties (and signatories) would not seem to make sense. This precludes justification of any attitude which lays the blame for non-adherence to the Moon Agreement squarely with the industrialised states – but it also allows more easily for a balanced solution in the context of the Moon Agreement, and probably allows for some hope that this might still be achieved!

The comparison with the developments in the law of the sea is telling from this point of view. The UN Convention on the Law of the Sea, drafted after eight years of intensive discussions and negotiations, had to deal with essentially the same fundamental juxtaposition of political opinion with respect to the ocean floor. The relevant part of the Convention provided that the ocean floor would be the common heritage of mankind, and elaborated the application of that principle to any exploitation projected in practice in quite detailed fashion.⁷⁰ This part was included largely against the resistance of industrialised states, for similar reasons as in the case of the Moon Agreement. This resistance grew ever stronger afterwards and resulted in a rather large lack of ratifications on their side.

At the same time, the Convention in other parts developed and codified many rules which were generally agreeable or even favourable to the industrialised states also (for instance related to the territorial waters or the Exclusive Economic Zones). When therefore the continuously growing number of ratifications on the side of the Third World states brought entry into force of the Convention (which was to occur one year after the sixtieth ratification)⁷¹ ever nearer, pressure grew on the developed states. They had to find a solution which would on the one hand preserve the manifold benefits they had to gain as parties to the Convention from entry into force of the other parts of the Convention, while on

⁷⁰ See e.g. Artt. 136-140, United Nations Convention on the Law of the Sea.

⁷¹ Note that the Moon Agreement entered into force already after the fifth ratification had occurred; see Art. 19(3), Moon Agreement.

the other hand precluding the application of this particular part to which they were so much opposed.

Also the developing states were aware however that entry into force of the Convention without a major measure of adherence amongst the industrialised states (after all the ones closest to actually being able to exploit the ocean floor) would not be very conducive to serving their interests – and hence not a desirable outcome. Thus, on both sides a willingness arose to reconsider the results of the earlier negotiations as they had been formalised by and in the Convention. A compromise was found in the end by adding an Agreement to the Convention in 1994, de facto amending the Convention without requiring the formalities which would otherwise have been necessary.⁷²

In essence, the 1994 Agreement preserved the principle of the common heritage of mankind and its application to the ocean floor, but gave industrialised nations – especially those actively involved in any exploitation project at issue – a much larger voice in the actual decisions implementing the principle and the relevant procedures in any given case.

To the extent that similarities in attitudes might arise as regards Moon Agreement respectively UN Convention on the Law of the Sea (and a somewhat similar exercise with regard to the legal regime of Antarctica might also prove worthwhile from this perspective), de facto amendment of the Moon Agreement in the relevant direction could well be achievable, whether based on the same pragmatic approach as in the case of the law of the sea or through more formal amendment. Obviously, such amendment should *inter alia* deal with the gaps as discussed before, and provide for a sensible and widely-accepted liability regime. Also, a framework for licensing commercial (including private) activities should be provided. Where states will continue to be required under international space law to nationally implement its rules vis-à-vis commercial and/or private space activities by means essentially of licensing regimes, it is adamant that at the international level parameters for such national space legislation would be created. Such legislative actions at the international level would also clarify the issue of whether a moratorium on exploitation would apply in the absence of any specific provisions. This is, however, beyond the scope of the current discussion and discussion paper, which should henceforth focus on the extent to which the required changes should be achieved by formal amendment or by the more pragmatic approach taken to the UN Convention on the Law of the Sea.

7. Towards amending the Moon Agreement?

A very interesting effort to move the debate forward in this regard took place in the context of the International Law Association (ILA) Committee on Space Law. Extended discussions led to a proposal along the lines of the developments in the law of the sea to, on the one hand, maintain the common heritage of mankind-principle while trying to ensure, on the other hand, that it would not unnecessarily stifle any private and/or commercial initiatives with regard to the

⁷² See 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, entered into force 28 July 1996; 1836 UNTS 3; 33 ILM 1309 (1994); UKTS 1999 No. 82; Cm. 2705; ATS 1994 No. 32.

Moon.

Thus, Resolution 1/2002 was adopted at the ILA Conference in New Delhi, which stated *inter alia*:

“4. Regarding the 1979 Moon Agreement: CONSIDERING FURTHER that the common heritage of mankind concept has developed today as also allowing the commercial uses of outer space for the benefit of mankind, and that certain adjustments are suggested to article XI of this Agreement concerning the international regime to be set up for the exploitation of moon resources, which will make it more realistic in today’s international scenario”.⁷³

At the same time, whether within the context of a fundamentally amended and hence maintained common heritage of mankind-principle, or by a Moon Agreement amended so as to replace that principle with a more acceptable one, it is clear something needs to be done fairly soon with the impending further development and elaboration of plans to go back to the Moon, with a fundamental role envisaged for private commercial entities.

To reiterate: the major bone of contention in the Moon Agreement as it currently stands and the major reason for the almost universal lack of ratification and signatures, clearly is to be found in the provisions of Article 11, declaring the Moon and its natural resources the common heritage of mankind in apparent contrast to Article 4’s reference to the province of all mankind. Moreover, though the phrasing of Article 11(1) suggests that the Moon Agreement itself provides for its “expression”, this is only as far as that Agreement is concerned, and it does so without providing any details as to how the Moon might become subject to commercial exploitation and use, notably mining. In that sense, there is no real implementation or elaboration of the common heritage of mankind-principle provided for by the Moon Agreement.

Further to this, it may be noted that the review of the Agreement foreseen under Article 18, which was *inter alia* to elaborate implementation of Article 11, never materialised. It is interesting to note in this respect furthermore that the Moon Agreement apparently was drafted on the assumption that at least most of the major space-faring nations would become party, since Article 11(5) tasks “States Parties” to draft an international regime “as such exploitation is about to become feasible” – regardless of whose exploitation that would concern. This is one more reason for needing to clarify what could or should be expected from any such regime, if it comes about or is to be made to come about.

From this evaluation, almost inevitably the risk arises of (further) discarding the Moon Agreement altogether. *Mutatis mutandis* this means, that if the Moon Agreement could be saved by amendment “only”, such amendment should at least be 1) radical and 2) deal with Article 11 in particular. A mere recognition that the common heritage of mankind does not exclude private and commercial activities *de jure*, or even should take any valid and justified interests of private enterprise into consideration, may be insufficient for this purpose. At any rate, it

⁷³ See Report of the Seventieth Conference of the International Law Association, New Delhi, 2002 (2002), 14.

is not nearly detailed enough for the purpose of giving the various stakeholders a realistic idea of what to expect in legal terms once lunar exploitation would actually take off. It is with this in mind that hereunder some proposals for amendment are offered for discussion.

In addition, since the discussion in the ILA's Space Law Committee on this topic arose, a new legal problem regarding the legal regime applicable to the Moon – at least partly the consequence of the lack of authority and acceptance of the Moon Agreement – has developed: the claims to “real estate” on the Moon. A US citizen has been selling plots on the Moon to tens of thousands of people, and might thus be rapidly creating a new legal reality if the world community of states does not act unequivocally in establishing a more comprehensive legal regime for the Moon. This provides one more reason for rapidly bringing the Moon Agreement back into business as currently the most focused instrument (in spite of its many flaws even from this perspective) and the nearest to establishing any sort of “regime”.

If the task of amending the Moon Agreement in order to establish a fair balance between public and private interests is to be taken seriously, the following proposals for amendment might be helpful for focusing discussion. As the reader will notice, if only for discussion purposes the more radical approach of essentially carving out the common heritage of mankind-principle from the Moon Agreement is taken, since the mere inclusion hitherto of that notion already seems to block any detailed discussion of what rules, parameters and procedures should be established to properly balance public and private interests vis-à-vis lunar exploitation.

If, however, the compromise approach of the ILA Resolution is to be followed and if it is therefore to be decided that the common heritage of mankind-principle, after all, is not to be deleted from the Moon Agreement as is proposed below, then that concept should be (re)interpreted itself – for example by the same mechanism successful in the context of the law of the sea – so as to lead to the same de facto results.

The new wording proposed for the respective Articles is in bold italics for easy reference.

Firstly, Article 4, paragraph 1, should be amended to read as follows:

“The exploration and use of the Moon, including commercial exploitation and use, shall be the province of all mankind and shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development. Commercial exploitation and use are, however, only allowable in conformity with the provisions of Article 11. Due regard shall be paid to the interests of present and future generations as well as to the need to promote higher standards of living and conditions of economic and social progress and development in accordance with the Charter of the United Nations.”

Such an amendment would in one move achieve the application of a single concept to the Moon and other celestial bodies, doing away with any need to discuss whether exploitation is a form of use or not, and what boundaries would

or should exist between exploration and use on the one hand and natural resources and the Moon itself on the other. The de facto-extension of the concept of the province of all mankind to an area which would be the result, would not lead to any problems as such.

Secondly, Article 11, paragraph 1, should be amended to read as follows:

“1. The Moon and its natural resources are the province of all mankind, which finds its expression in the provisions of this Agreement and in particular in paragraph 5 of this article.”

Thus, the province of all mankind-principle here simply replaces the common heritage of mankind-principle. Again, the result would be a coherent application of one principle to the Moon and all of its aspects.

Thirdly, Article 11, paragraph 2, should be amended to read as follows:

“The Moon is not subject to national appropriation by any claim of sovereignty, by means of use or occupation, or by any other means. This shall not preclude any commercial exploitation or use as long as in conformity with the provisions of this article, other articles of this Agreement or any legal regime regarding commercial exploitation and use to be established on the basis of this Agreement.”

Of course, the special character of the Moon calls for at least as coherent a regime for commercial exploitation – on the international level! – as has been achieved with respect to the high seas in the context of the UN Convention on the Law of the Sea. This amendment, furthermore, preserves the major thrust of the ILA Resolution on this topic.

Fourthly, Article 11, paragraph 3, should be amended to read as follows:

“Neither the surface nor the subsurface of the Moon, nor any part thereof, shall become property of any State, international intergovernmental or non-governmental organization, national organization or non-governmental entity or of any natural person. The placement of personnel, space vehicles, equipment, facilities, stations and installations on or below the surface of the Moon, including structures connected with its surface or subsurface, shall not create a right of ownership over the surface or the subsurface of the Moon or any areas thereof. The foregoing provisions are without prejudice to the international regime referred to in paragraph 5 of this article.”

This means, that the reference to “or natural resources in place” between “any part thereof” and “shall become the property” has been deleted; this should be deemed a logical consequence of defining the Moon in all its aspects as constituting the province of all mankind, as a kind of *res* or *terra communis-plus*. It should be sufficient to heed the interests of private entities in preventing any possible parasitic profiteer from moving into a certain mining area once investment in infrastructure and mining operations has actually begun, whilst on the other end the continuation of the prohibition of appropriation of surface, subsurface and any part thereof precludes any undue “reservation” of sites.

Fifthly, Article 11, paragraph 5, should be amended to read as follows:

“States Parties to this Agreement hereby undertake to establish an international regime, including appropriate procedures, to govern the exploitation of the natural resources of the Moon, including commercial exploitation by non-governmental entities. Such international regime should include as a minimum:

- the duty of establishing a licensing obligation by means of national law for every State Party whose non-governmental entities are interested in undertaking relevant activities;
- guidelines for the license requirements to be imposed;
- the duty of establishing a transparent, fair and comprehensive monitoring system in respect of activities thus licensed;
- a procedure for international registration of activities on the Moon licensed in accordance with this regime, including payment of a reasonable registration fee to the international authority charged with such registration; and
- a procedure for providing other States Parties involved, or on behalf of their non-governmental entities involved, with reasonable means to ascertain that their rights and interests are duly respected.

In the absence of such a regime, commercial exploitation and use of the Moon will be permitted on the condition that no commercial exploitation or use of the Moon should cause serious harm to the interests of other States Parties, including their economic interests, substantially put the possibilities for future exploitation and use at risk, or substantially put the Moon’s environment at risk. Also, such commercial exploitation and use will continue to be subject to the provisions of this Agreement, including the general principles of paragraph 7.”

Thus, any reference to “exploitation” “about to become feasible”, as well as a regime to be established by Articles 11(5) and 18, would be deleted. Also, this seems to be the proper place to at least outline the major elements of any future regime for commercial (exploitation) activities on the Moon, in order to most prominently dispel any fear that opening up the Moon in principle to commercial exploitation would be akin to kicking off a gold rush without any law applicable but that of force and of the most powerful. The last two sentences address worries that, in the absence of any more detailed regime, the Moon would be regarded as a free for all by certain private endeavours.

Sixthly, Article 11, paragraph 7, should be amended to read as follows:

“The main purposes of the international regime to be established shall include:

- (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.”

This means, that the comprehensive paragraph (d), “An equitable sharing by all States Parties 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 give special consideration”, would be deleted. To the extent that “equity” is perceived equivalent to, or as the core principle of, the common heritage of mankind, as the most contentious element of the common heritage of mankind-concept for those states opposed to the Moon Agreement so far – at

least as far as the developed countries are concerned – its removal would be helpful for the reasons indicated. To the extent “equity” means something else, it is submitted that this is essentially covered by the other clauses of the Moon Agreement in their amended versions as proposed – and to some extent even in the Outer Space Treaty itself.

Finally, Article 18 should be deleted; Articles 19-21 should accordingly be renumbered Articles 18-20; and the reference to Articles 17 to 21 in Article 16 should accordingly be changed into a reference to Articles 17 to 20.

8. Concluding remarks

The above presents a – knowingly – challenging and perhaps even radical approach, as probably befits a discussion paper. It is important to note, however, that firstly, the current lack of clarity in legal terms – as to the status of the Moon and various aspects thereof, as to the rights and duties with respect to possible exploitation of lunar resources, as to the lawful role of private enterprise in that undertaking – is of no benefit to anyone, from developed and developing worlds alike, except those not interested in abiding by any law or regulation. Secondly, imperfect as it may be, the Moon Agreement still represents the best starting point for developing a regime that establishes the proper balance between public and private interests with respect to the Moon and any commercial activity there. The new lease on life of the Moon Agreement offers some interesting new perspectives in that direction. Thirdly, however, bold steps are necessary on the other hand if the Moon Agreement is to do as bid in that regard: mere re-interpretations by means of non-binding documents likely will not do. They would only allow uncertainties to continue to exist, and this is not really acceptable when many and major interests, public and private, commercial as well non-commercial, are at stake in such a unique environment as the Earth’s sole natural satellite. The Moon, it seems, will soon be part of business; it is therefore a lawyer’s business to see to it that also a rejuvenated Moon Agreement will be part of that deal.

Belgium for the Development of a Legal Framework of Universal Areas' Exploration and Exploitation or The Raise of a General Theory of Mankind's Common Heritage

By
Jean-François Mayence
Legal Unit "International Relations"
Federal Office for Science Policy
Brussels, Belgium

Which were the reasons why Belgium became party to the 1979 UN Moon Agreement in July 2004.

The answer is threefold:

1. A strong political signal

In the logical follow-up of the re-activation of Belgian participation in the work of the UNCOPUOS Legal Sub-Committee, the application by Belgium of the five UN space treaties constituted a strong political signal in favor of the strengthening of international space law. European countries, members of ESA, such as Austria or the Netherlands, were already parties to the 1979 UN Moon Agreement. This participation offered Belgium a strong position to claim a better application of the five UN space treaties, including the Moon Agreement.

2. A time for opportunities

This legal step was also justified by the fact that several national or international space organizations had recently been entrusted, at the highest political level, with the preparation of new exploration missions aiming at discovering the Moon and other celestial bodies of the Solar System. This has been the case so far for Europe (ESA's missions) and for US. India and Russia are closely following a similar approach.

In his "Vision for Space Exploration", the US President quoted the main goals of such exploration programs:

"The fundamental goal of this vision is to advance U.S. scientific, security, and economic interests through a robust space exploration program. In support of this goal, the United States will:

- implement a sustained and affordable human and robotic program to explore the solar system and beyond;
- extend human presence across the solar system, starting with a human return to the Moon by the year 2020, in preparation for human exploration of Mars and other destinations;
- develop the innovative technologies, knowledge, and infrastructures both

- to explore and to support decisions about the destinations for human exploration; and
- promote international and commercial participation in exploration to further U.S. scientific, security, and economic interests.”

The achievement of those goals is notably based on the “use lunar exploration activities to further science, and to develop and test new approaches, technologies, and systems, including use of lunar and other space resources, to support sustained human space exploration to Mars and other destinations” (emphasis added).

The 1979 UN Moon Agreement appeared to Belgium as an appropriate and suitable legal framework for space missions using the Moon and other celestial bodies’ resources for scientific, technological or even economical purposes.

3. A concept for the future of international law

Belgium has always been a champion of the development and the strengthening of international law, of its best capacity to respond to global stakes concerning current populations and next coming generations.

The 1979 UN Moon Agreement is one of the two existing instruments of conventional international law that use the concept of Common Heritage of Mankind. This concept has been quite often analyzed and, according to some views expressed in the literature of those two last decades, may provide international law with some effective means to address global problems of vital importance. Wealth management, access to vital resources, equitable sharing of welfare, those issues are, or at least should be, on the agenda of all Governments. Water, air, land, flora and fauna, biodiversity are the thematics of international flora enlightening the urgent need for a strong political reaction. But it is true that lawyers must not remain awaiting such reaction. They have their own responsibilities in the development of the appropriate legal framework.

By formulating a general theory based on several concepts and their main features, international law could anticipate the political debate. Those existing tools are provided by international treaties among which the UN space treaties are not the least ones: concepts such as Common Heritage of Mankind¹, Province of All Mankind², Benefit of Mankind³, Common Concern of Mankind⁴, Res Communis⁵ or Global Public Goods⁶ are not only philosophical expressions. Their common or respective features set up the basis for a new general theory. Those features are the following:

¹ As provided for by the 1982 UNCLoS Convention and by the 1979 UN Moon Agreement.

² As provided for by the 1967 UN Outer Space Treaty and by 1996 UNGA Resolution on Space Benefits.

³ As provided for by the 1982 UNCLoS Convention and by the 1963 UNGA Resolution on the Space Law Principles.

⁴ As provided for by the 1988 UNGA Resolution on the Protection of the Atmosphere.

⁵ As provided for by Roman civil law.

⁶ As developed in 1954 by US economist Paul Samuelson. See one of the sub-categories of this notion, namely the concept of “*Global Policy Outcomes*”, and its potential applications to space resources management.

- absence of national sovereignty (no private or national appropriation, freedom of access);
- setting up of a regime for the exploitation of resources entrusted to a dedicated international body and based on a positive discriminatory treatment;
- a *stipulatio universalis*, in the meaning of an undertaking by the States parties to the benefit of any third parties: States, citizens, next generations;
- States' international responsibility/liability for the activities of exploration/use/exploitation;
- "peaceful purposes".

4. Conclusion

The accession to the Moon Agreement by Belgium represents a step towards a better application of international space law, but also a legal policy decision considering new exploration missions which need a suitable legal framework. The Moon Agreement is seen by Belgium as providing such framework. It allows and fosters the setting up, in due time, of an exploitation mechanism based on the concept of Common Heritage of Mankind. Such mechanism is not considered by the 1967 UN Outer Space Treaty.

Moreover, the concept of Common Heritage of Mankind may be seen as the core element of a general theory granting Mankind the status of international legal entity, able to claim rights on behalf of every world citizens and to fulfil its obligations towards States but also next generations.

Commentary Paper on the Discussion Paper Titled *The Acceptability of the Moon Agreement and the Road Ahead* by Dr. Frans von der Dunk

Ricky J. Lee*

Director, Robert Chruszcz & Associates

Lecturer in Law, Flinders University of South Australia

INTRODUCTION

The author is greatly honoured to be included in the program for this workshop and thanks the Institute of Air and Space Law of the Faculty of Law, McGill University, and the International Institute of Space Law for their invitation. The author would also like to congratulate Dr. Frans von der Dunk for his excellent discussion paper and wishes on this occasion to respectfully make some comments in the hope of being able to contribute to the discussion at this workshop. This is particularly so on the express terms of the Moon Agreement and their acceptability to the international community today and in the foreseeable future.

At the risk of an oversimplification, Dr. Frans von der Dunk has made the following points:

1. exploitation of mineral resources on the Moon will be the focus of commercial interest in the Moon in the foreseeable future;
2. the legal questions of paramount importance is territorial sovereignty and property rights;

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This paper is adopted and based in part from previous papers of the author titled *Definitions of "Exploration" and "Scientific Investigation" with Focus on Mineralogical Prospecting and Exploration Activities* and *Article II of the Outer Space Treaty and Human Presence on Celestial Bodies: Prohibition of State Sovereignty, Exclusive Property Rights, Or Both?*, presented at the International Astronautical Congress, 17-21 October 2005 in Fukuoka, Japan.

* This paper is written in the personal capacity of the author and does not necessarily represent the views of any organisation with which he is affiliated. Its contents are not, and are not intended to be, legal advice and may not necessarily reflect the most recent developments in the law. Author e-mail: rjlee@rickylee.com.au.

3. the effect of the Moon Agreement on commercial activities in general;
4. the effect of Article 11 of the Moon Agreement and the plausibility of amendments to Article 11 in order to improve its acceptability to the international community.¹

These issues are commented on in further detail below.

EXPLOITATION POTENTIAL OF THE MOON

The relatively deep gravity well of the Moon *vis-à-vis* Near Earth Asteroids requires a comparatively higher escape velocity to launch materials from the Moon's surface and, similarly, a high amount of thrust to enable a soft landing on the Moon from lunar orbit. As a result, the propulsion system used for any transportation vehicle between the Moon and Earth orbit must rely on a chemical or nuclear propellant, imposing a severe constraint on the costs of transport.² However, this heavy gravity also means that the design of structures and materials handling processes on the Moon would not have to be dissimilar from that of the Earth and civil engineering would also be simpler as a result of the gravity, making it possible for us to apply the engineering principles as that applied on the Earth.³ This means that large-scale mining operations can take place on the Moon to take advantage of potential economies of scale.

One clear advantage of mining lunar resources is its proximity to the Earth, and the fact that it is orbiting the Earth rather than the Sun or another planet in the Solar System means that it is accessible at any time. The short distance between the Earth and the Moon means that

¹ Von der Dunk, *The Acceptability of the Moon Agreement and the Road Ahead* (2006), paper presented at the International & Interdisciplinary Workshop on Policy and Law Relating to Outer Space Resources: The Example of the Moon, Mars & Other Celestial Bodies, 28-30 June 2006 in Montréal, Canada.

² Wingo, *MOONRUSH: IMPROVING LIFE ON EARTH WITH THE MOON'S RESOURCES* (2004), at 163.

communications is virtually instantaneous, allowing for real-time remote control of robotic mining operators from the Earth. The substantial water deposits on the Moon that were discovered in 1995 make the Moon potentially a good location for a permanent lunar settlement as well as providing for *in situ* production of hydrogen and oxygen fuels for propulsion, provided that a means of replenishing or recycling such water supplies can be found.⁴

As the only celestial body outside the Earth that has been physically visited by humans, there is a large amount of information available about the geology and mineral composition of the Moon. Analysis of lunar soil samples collected from the Apollo missions revealed that the lunar soil contains oxygen, silicon, aluminium, iron, calcium, magnesium and titanium in various compounds.⁵ Even though the Moon has hardly any free metal available for mining purposes, the processes for producing iron and oxygen from ilmenite as well as aluminium and oxygen from feldspar have been studied in scientific circles.⁶ If solar cells can be manufactured on site, the production of solar cells for deployment of solar power satellites in Earth orbit is also a possibility for lunar export.⁷

In the short term, it is likely that the most valuable resource to be exploited from the Moon would be the collection of helium-3 (He-3), which is used for various medical and nuclear applications.⁸ Helium-3 is extremely rare on Earth as it is lost through dissipation in the upper reaches of the atmosphere, but it is collected in abundance from the solar wind in the Moon. In the longer term, the

³ United States Army Corps of Engineers, *Proceedings of a Workshop on Extraterrestrial Mining and Construction* (1990) USACERL SPECIAL REPORT M-92/14.

⁴ Wingo, *supra* note 2, at 204-205.

⁵ See Heim, *Exploring the Last Frontiers for Mineral Resources: A Comparison of International Law Regarding the Deep Seabed, Outer Space and Antarctica* (1990) 23 VAND. J. TRANS. L. 819 at 831.

⁶ Agosto, *Beneficiation and Powder Metallurgical Processing of Lunar Soil Metal* (1981), paper presented in the 5th Princeton / AIAA Conference on Space Manufacturing, May 1981, in Princeton, New Jersey, United States of America.

⁷ Criswell, *Lunar Solar Power System: Scale and Cost* (1995), paper presented at the 45th International Astronautical Congress, 9-14 October 1995, in Jerusalem, Israel.

proximity of the Moon and the abundance of mineral resources available would make it a very attractive candidate for exploitation, especially during the development of large scale infrastructures in Earth orbit. These infrastructures may form the foundations for future exploration and utilisation of the more distance parts of the Solar System, such as Mars, its satellites Phobos and Deimos, and the Near Earth Asteroids.

TERRITORIAL SOVEREIGNTY AND PRIVATE PROPERTY RIGHTS

National Appropriation

On the subject of territorial sovereignty and private property rights, the first question that needs to be addressed in the context of the scope, content and effect of Article II of the Outer Space Treaty is its applicability to non-governmental and/or private entities. As Tennen noted, Article II does not refer explicitly to private entities even though the extension of the non-appropriation doctrine to private entities is “firmly established in space law”.⁹ As with the discussion in the context of Article VI of the Outer Space Treaty, any act of national appropriation in outer space and on celestial bodies that are conducted under the State’s direction or influence, regardless of whether the act was undertaken by public or private entities, is prohibited. As Article VI requires the appropriate State to authorise and continually supervise the space activities of private entities, any act of national appropriation by private entities would be subject to the direction or influence of the State, thus contravening Article II of the Outer Space Treaty. Accordingly, it is clear that Article II must extend to private acts of national appropriation as well as those conducted directly by the State itself.

⁸ U.S. Department of Energy, *Isotope Uses* (2003) <<http://www.ne.doe.gov/isotopes/ipuses.asp>>, last accessed on 22 December 2004.

⁹ Tennen, *Second Commentary on Emerging System of Property Rights in Outer Space* (2003) PROCEEDINGS OF THE UNITED NATIONS / REPUBLIC OF KOREA WORKSHOP ON SPACE LAW 342 at 343.

The second question arises as Article II does not purportedly prohibit all forms of appropriation but merely “national” appropriation. This must be considered as an issue of *scope* as distinct to that to the issue of whether Article II would have *application* to private and non-governmental entities, for otherwise it may be possible for States to circumvent the prohibitions contained in the Outer Space Treaty simply by “privatising” the contravening activity.¹⁰ There is a significant body of opinion among commentators that Article II also prohibits the creation of private property rights.¹¹ Further, it is useful here to consider the relevant provisions of the Moon Agreement, for although it has not received widespread acceptance in the international community, its provisions may provide some guidance in the interpretation of Article II of the Outer Space Treaty, to which the Moon Agreement is intended to be an extension and thus complementary.¹² To that end, part of Article 11 of the Moon Agreement provides that:

The Moon is not subject to national appropriation by any claim of sovereignty, by means of use or occupation, or by any other means.

Neither the surface nor the subsurface of the Moon, nor any part thereof or natural resources in place, shall become property of any State, international intergovernmental or non-governmental organisation, national organisation or non-governmental entity or of any natural person. The placement of personnel, space vehicles, equipment, facilities, stations and installations on or below the surface of the Moon, including structures connected with its surface or subsurface, shall not create a right of ownership over the surface or the subsurface of the Moon or any areas thereof. ...

If “national” appropriation as contained in Article II of the Outer Space Treaty and Article 11(2) of the Moon Agreement means appropriation by both the State and private entities, then the first provision of Article 11(3) is redundant, at least to the extent that it applies to the surface of the

¹⁰ See discussion in Tennen, *supra* note 9, at 344; and Sterns and Tennen, *Privateering and Profiteering on the Moon and Other Celestial Bodies: Debunking the Myth of Property Rights in Space* (2003) 31 ADV. SPACE. RES. 2433.

¹¹ See, for example, Prevost, *Law of Outer Space Summarised* (1970) 19 CLEV. ST. L. REV. 595 at 606; and Tennen, *Outer Space: A Preserve for All Humankind* (1979) 2 HOUS. J. INT’L. L. 145 at 149.

Moon. One further noteworthy observation that may be made from this is that Article 11(3) of the Moon Agreement states that the Moon cannot become the “property” of any State, even though this would apparently be the existing effect of Article 11(2) by prohibiting the national appropriation of the Moon.

It appears from the above discussion that, if Article 11(3) of the Moon Agreement is to have a meaning distinct to that of Article 11(2) and, therefore, Article II of the Outer Space Treaty, then “national appropriation”, as a term, must have a meaning different to that of attaining property rights by the State. This narrow approach to the interpretation of Article II, in contrast to a broader one that includes exclusive property rights, is supported by some commentators.¹³ To that end it may be prudent to contrast these provisions with Article 137 of the United Nations Convention on the Law of the Sea (“UNCLOS”) relating to the deep seabed (the “Area”), which states that:

No State shall claim or exercise sovereignty or sovereign rights over any part of the Area or its resources, nor shall any State or natural or juridical person appropriate any part thereof. No such claim or exercise of sovereignty or sovereign rights nor such appropriation shall be recognised.¹⁴

It is clear from the above that Article 137(1) of UNCLOS expressly prohibits the following acts:

- (1) claim of sovereignty over any part of the Area by a State;
- (2) exercise of sovereignty over any part of the Area by a State;
- (3) appropriate any part of the Area by a State; and

¹² Galloway, *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies* (1980) 5 ANN. AIR & SP. L. 481 at 498-499.

¹³ See, for example, Christol, *The Common Heritage of Mankind Provision in the 1979 Agreement Governing the Activities of States on the Moon and other Celestial Bodies* (1980) 14 INT’L. LAWYER 429 at 448; and Gorove, *Interpreting Article II of the Outer Space Treaty* (1969) 37 FORDHAM L. REV. 349 at 351.

¹⁴ The “Area” is defined in UNCLOS, Article 1(1) as “the seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction”.

- (4) appropriate any part of the Area by a natural or juridical person.

It is apparent from Article 137(1) of UNCLOS does not prohibit the exercise of sovereignty by natural or juridical persons. From this, it may be suggested that the UNCLOS considered only States can assert or exercise sovereignty over territory while both States and nationals can appropriate land. This is consistent with the distinction drawn in customary international law, which considered sovereignty, or the ability to assert jurisdiction, to be the exclusive province of States and appropriation or title, or the ability to obtain exclusive possession, to be capable of assertion by both States and private nationals.¹⁵ When read in light of this distinction, “national appropriation” in Article II of the Outer Space Treaty may mean no more than the “exercise of sovereignty”. Accordingly, Article II does not prescribe any rights or duties concerning the assertion of title by private nationals, as long as they do not amount to an exercise of sovereignty by the State as the British East India Company once did for Great Britain in earlier centuries.¹⁶ Similarly, Article 11(2) of the Moon Agreement would now be consistent and complementary with Article 11(3), the former dealing with the exercise of sovereignty by States and the latter with the ability to assert title by States and private nationals. This is considered in detail below.

“By Any Other Means”

Lachs, who held the chair of the Legal Sub-Committee during the debates on the Outer Space Treaty, emphasised the prohibition of appropriation based on “use” and “occupation”, as he was of the

¹⁵ Gorove, *Interpreting Article II of the Outer Space Treaty* (1969) 37 FORDHAM L. REV. 349 at 351; and White, *Real Property Rights in Outer Space* (1997) 40 PROC. COLL. L. OUTER SP. 370 at 372.

¹⁶ See, for example, Krasner, *Think Again: Sovereignty* (2001) 122 FOREIGN POLICY 20.

view that in such a way Article II had prevented the creation of “titles”.¹⁷ As discussed previously, the use of the term “title” in the context of “national appropriation” is clearly meant to indicate claims of national sovereignty by States rather than that for proprietary or private ownership rights.¹⁸ In any event, having reached such a conclusion, Lachs noted the phrase “by any other means” and asked: “What other means are there?”¹⁹

Some commentators suggested that the phrase “by any other means” was not meant to refer to specific means but that it includes “whatever residue of international law applies to national appropriation, and has no limitation”.²⁰ Lachs lent further support to this view by asserting that all other means were discussed “precisely to illustrate the unreality of their application to it. It was *ex abundante cautela* that these titles were indicated and at once discarded”.²¹ Further, Lachs went on to suggest three possible “other means”, namely discovery, contiguity and parts of outer space immediately bordering airspace, and considered them all inadequate in asserting a claim of national appropriation.²²

The difficulty with the approach adopted by Lachs is that it assumed that the phrase “by any other means” was subject *eiusdem generis* to the means already enumerated. Christol, on the other hand, was of the view that the phrase “by any other means” has a life of its own.²³ This is because the provision “by claims of sovereignty, by means of use or occupation” is all encompassing and thus the phrase “by any other means” would not add anything to its legal effect. Christol suggested that the

¹⁷ Manfred Lachs, *THE LAW OF OUTER SPACE: AN EXPERIENCE IN CONTEMPORARY LAW MAKING* (1972), at 43. The British delegation was of the same view, in that “no State is able to establish an exclusive title to any part of outer space”: Darwin, *The Outer Space Treaty* (1967) 42 BRIT. Y. B. INT’L. L. 282.

¹⁸ Vlasic, *The Space Treaty: A Preliminary Evaluation* (1967) 5 CAL. L. REV. 512.

¹⁹ Lachs, *supra* note 17, at 43.

²⁰ Bhatt, *Legal Control of the Exploration and Use of the Moon and Celestial Bodies* (1968) 8 INDIAN J. INT’L. L. 38; and Brooks, *Control and Use of Planetary Resources* (1969) 11 PROC. COLL. L. OUTER SP. 342.

²¹ Lachs, *supra* note 17, at 43-44.

²² *Ibid.*, at 43.

negotiating history of Article II, as evidenced by the *travaux préparatoire* of the Outer Space Treaty, the phrase “by any other means” was designed to impose the same restrictions on individuals and private entities.²⁴ If this interpretation is accepted, then “by any other means” would include the exercise of sovereign rights by States through private use, private occupation and assertions of private exclusive rights. This interpretation, though creative, is nevertheless consistent with the idea that Article II relates only to exercise of state sovereignty or “national appropriation” and, in that context, refers only to a State exercising sovereign rights through private use or occupation of celestial bodies.

Relevant Comparative Provisions of the Moon Agreement

Non-Appropriation: Article 11(2)

Article 11 of the Moon Agreement, in seeking to repeat the provisions of Articles I and II of the Outer Space Treaty, have presented in itself some issues of interpretation that it would be prudent to investigate. To begin with, it should be noted that the Moon Agreement applies not only to the Moon, but also to other celestial bodies in the Solar System and orbits and trajectories around them.²⁵ Accordingly, the provisions of the Moon Agreement would be applicable to the Moon, the other planets and their natural satellites as well as asteroids.

In an identical manner to Article II of the Outer Space Treaty, Article 11(2) of the Moon Agreement prohibits “national appropriation” by any claim of sovereignty, by means of use or occupation or by any other means. From the analysis concerning Article II of the Outer Space Treaty above, “national

²³ Christol, *Article 2 of the 1967 Principles Treaty Revisited* (1984) 9 ANNALS AIR & SP. L. 217 at 241.

²⁴ *Ibid.*, at 263.

²⁵ Article 1(1) of the Moon Agreement provides that: “The provisions of this Agreement relating to the Moon shall also apply to other celestial bodies within the solar system, other than the Earth, except insofar as specific legal norms enter into force with respect to any of these celestial bodies.” Article 1(2) further provides that “For the purposes of this Agreement reference to the Moon shall include orbits around and other trajectories to or around it.”

appropriation” would mean no more than exercise of state sovereignty so that Article 11(2), as is the case with Article II of the Outer Space Treaty, prohibits only the exercise of state sovereignty but has no effect on the creation of exclusive property rights by States or their private nationals.

Freedom of Exploration and Use: Articles 11(4) and 6

The three freedoms provided for under Article I of the Outer Space Treaty, namely the freedom of exploration, freedom of use and freedom of scientific investigation, find expression in Articles 11(4) and 6 of the Moon Agreement. Article 11(4) of the Moon Agreement provides that:

State Parties have the right to exploration and use of the Moon without discrimination of any kind, on the basis of equality and in accordance with international law and the terms of this Agreement.

It is clear that Article 11(4) is simply a reproduction of the language contained in Article I of the Outer Space Treaty, except that the Moon Agreement does not provide for “free access to all areas of celestial bodies”. This may be considered not to be of great significance in light of the fact that the assertion and maintenance of exclusionary title on the surface and subsurface of the Moon is specifically prohibited under Article 11(3) of the Moon Agreement and generally under Article II of the Outer Space Treaty. In any event, the full force and effect of Article I of the Outer Space Treaty would continue to apply as it is not inconsistent with Article 11(4) of the Moon Agreement.

Similarly, Article 6(1) of the Moon Agreement provides that:

There shall be freedom of scientific investigation on the Moon by all State Parties without discrimination of any kind, on the basis of equality and in accordance with international law.

The requirement that scientific investigations on the Moon be conducted on the basis of equality and without discrimination of any kind is not found in Article I of the Outer Space Treaty. This also may not necessarily be of great significance in the context of lunar activities for at least two reasons:

- (1) the activities involved in scientific investigations may well encompass the exploration and/or use of outer space and celestial bodies and, consequently, would be subject to the existing equality and non-discrimination requirements under Article I of the Outer Space Treaty and Article 11(4) of the Moon Agreement; and
- (2) Article 6(2) of the Moon Agreement, for example, provides specific rights and duties concerning the collection of mineral samples from celestial bodies, thus giving specific content to the limitations on the freedom of scientific investigation on the Moon.

Prohibition of Private Title: Article 11(3)

Article 11(3) of the Moon Agreement contains the following specific prohibitions:

- (1) the surface of a celestial body or any part thereof cannot become the “property” of any State, intergovernmental or non-governmental organisation, domestic governmental or non-governmental organisation and natural persons;
- (2) the subsurface a celestial body or any part thereof cannot become the “property” of any State, intergovernmental or non-governmental organisation, domestic governmental or non-governmental organisation and natural persons;
- (3) natural resources in place on the surface or subsurface of a celestial body cannot become “property” of any State, intergovernmental or non-governmental organisation, domestic governmental or non-governmental organisation and natural persons; and

- (4) placement of personnel, vehicles, equipment, facilities, stations and installations on the surface or subsurface of a celestial body cannot create a right of “ownership” over that surface or subsurface.

There is little doubt that “property” in this case means having title, especially when taking into account the wording of the other authentic texts.²⁶ This is because, although the French word “propriété” and the Spanish word “propiedad” both for most intents and purposes means “property”, the Chinese term 「财产」 can be translated as both “asset” and “property”.²⁷ This is further reinforced by the reference to “ownership” in the last provision of Article 11(3), indicating that “property” in this context must be the exercise of some form of title or property right over the surface or subsurface of the Moon or other celestial bodies, including its natural resources.

This effectively means that, although there are a significant number of commentators who were of the view that Article II of the Outer Space Treaty prohibited the creation of property rights on celestial bodies, this prohibition arguably did not in fact come into existence until the adoption of Article 11(3) of the Moon Agreement. In a practical context, with the extraction of mineral

²⁶ Article 21 of the Moon Agreement provides that the Arabic, Chinese, English, French, Russian and Spanish texts are equally authentic.

²⁷ Commercial Press, *A New English-Chinese Dictionary* (2nd ed., 1984), at p. 75. The French text of Article 11(3) provides that “Ni la surface ni le sous-sol de la Lune, ni une partie quelconque de celle-ci ou les ressources naturelles qui s’y trouvent, ne peuvent devenir la propriété d’États, d’organisations internationales intergouvernementales ou non gouvernementales, d’organisations nationales ou d’entités gouvernementales, ou de personnes physiques. L’installation à la surface ou sous la surface de la Lune de personnel ou de véhicules, matériel, stations, installations ou équipements spatiaux, y compris d’ouvrages reliés à sa surface ou à son sous-sol, ne crée pas de droits de propriété sur la surface ou le sous-sol de la Lune ou sur une partie quelconque de celle-ci ...”. The Spanish text states that “Ni la superficie ni la subsuperficie de la Luna, ni ninguna de sus partes o recursos naturales podrán ser propiedad de ningún Estado, organización internacional intergubernamental o no gubernamental, organización nacional o entidad no gubernamental ni de ninguna persona física. El emplazamiento de personal, vehículos espaciales, equipo, material, estaciones e instalaciones sobre o bajo la superficie de la Luna, incluidas las estructuras unidas a su superficie o la subsuperficie, no creará derechos de propiedad sobre la superficie o la subsuperficie de la Luna o parte alguna de ellas ...”. The Chinese text provides that

「月球的表面或表面下层或其任何部分或其中的自然资源均不应成为任何国家、政府间或非政府国际组织国家组织、或非政府实体或任何自然人的财产。在月球表面或表面下层,包括与月球表面或表面下层相连接的构造物在内,安置人员、外空运载器、装备设施、站所和装置、不应视为对月球或其任何领域的表面或表面下层取得所有权。...」

resources as an example, these prohibitions clearly impose a severe constraint on the ability of States and private entities to engage in the extraction of mineral resources from the surface or subsurface of celestial bodies.

COMMERCIAL ACTIVITIES AND THE MOON AGREEMENT

The Legal Provisions

Article I of the Outer Space Treaty provides for two of the most fundamental principles of international space law.²⁸ These are the freedoms of exploration, access and use by all countries on a non-discriminatory basis and that space activities are to be carried out for the benefit and in the interest of all countries.

The practical impact of these legal rights and duties on commercial applications in outer space, in particular the meanings of the terms “exploration” and “scientific investigation” in Article I, are substantial but is often considered by various commentators in abstract only. This is despite the commonly accepted view among legal scholars that these legal rights and duties may represent binding international legal principles rather than mere rhetoric.²⁹

In the case of mineralogical prospecting and exploitation activities on the Moon, it is clear that the following three principles will have a practical impact:

- (1) exploration and use of celestial bodies to be carried out for the benefit and in the interest of all countries;

²⁸ (1967) 610 U.N.T.S. 205; 18 U.S.T. 2410; T.I.A.S. 6347; 6 I.L.M. 386.

²⁹ See, for example, Vereshchetin and Danilenko, *Custom as a Source of International Law of Outer Space* (1985) 13 J. SP. L. 22; and He, *The Outer Space Treaty in Perspective* (1997) 25 J. SP. L. 93.

- (2) all countries have the freedom to explore and use celestial bodies on a basis of equality and without discrimination of any kind; and
- (3) all countries have the freedom to undertake “scientific investigations” on celestial bodies.

This is further reinforced by Article IX of the Outer Space Treaty, which requires countries to have “due regard” for the “corresponding interests” of other countries in the conduct of their space activities. As discussed below, this obligation in Article IX may have some influence over the appropriate interpretation to be applied to the requirement contained within Article I.

Space Activities Carried on for the Benefit and in the Interest of All Countries

The crucial determination to be made in the context of requiring space activities to be “for the benefit and in the interest of all countries” is whether this imposes a positive and specific obligation “regarding the sharing the benefits of space exploration and use” or merely an “expression of desire that the activities should be beneficial”, in contrast to being harmful “in a general sense”.³⁰ Gorove, who had analysed this provision in detail, argued for the latter and regarded most commercial space activities, such as satellite telecommunications, television broadcasting, remote sensing and power generation as being beneficial in a general sense and were sufficient to satisfy the requirement without the need to share any other benefit.³¹ In so doing, Gorove pointed to a number of factors that persuaded him to that view, which is shared by commentators from both industrialised and developing countries.³²

³⁰ Gorove, *Implications of International Space Law for Private Enterprise* (1982) 7 ANNALS AIR & SP. L. 319 at 321.

³¹ Gorove, *Freedom of Exploration and Use in the Outer Space Treaty* (1971) 1 DENVER J. INT'L. L. & POL'Y. 93.

³² See, for example, Williams, *Las empresas privadas en el espacio ultraterrestre* (1983) 8 REVISTA DEL CENTRO DE INVESTIGACIÓN Y DIFUSIÓN AERONÁUTICO-ESPACIAL at 39; and Castillo Argañarás, *Benefits Arising From Space Activities and the Needs of Developing Countries* (2000) 43 PROC. COLL. L. OUTER SP. 50 at 57.

First, the basis and criteria for determining what is of benefit to a particular country are almost entirely subjective determinations. What may be considered beneficial to one country may well be detrimental to another. Further, what may be considered beneficial today may be considered detrimental tomorrow with the aid of new information and the benefit of hindsight.³³ As there are no means for the compulsory settlement of disputes between countries in the Outer Space Treaty, it is likely and foreseeable that each country would insist on determining the beneficial aspects of an activity based on its own subjective criteria and seek to enforce the requirements of Article I as prohibitions. They can then either restrain them from continuing with the conduct and/or to require compensation to be paid. This is unlikely to have been the intended outcome of the drafters of Article I.

Second, the benefits and interests of all countries must include, by definition, the country that was conducting that particular exploration and use of outer space and/or the celestial bodies.³⁴ Accordingly, the interests of that country, presumably extending to commercial interests, would not be served if they were not taken into account in assessing the benefits derived from a particular activity in outer space. In other words, even if the requirement imposed a specific duty to “share” the “benefits” among all countries, such a requirement must be considered as including to the commercial interests, among other interests, of the country conducting the space activity in question.

Third, it is unclear from the provision whether it is the means (*obligation de moyens*) or the ends (*obligation de résultat*) that must be in the interest and for the benefit of all countries.³⁵ If it is the ends derived from such activities, then it must be noted that the existing body of space law provides

³³ He, *supra* note 29, at 104.

³⁴ Gorove, *supra* note 30, at 321.

³⁵ Such a distinction was made by Kerrest in the context of Article VI of the Outer Space Treaty. See Kerrest, *Commercial Use of Space, including Launching* (2004), in China Institute of Space Law, 2004 SPACE LAW CONFERENCE: PAPER ASSEMBLE 199 at 200.

no mechanism for any sharing or distribution of such benefits, even though one would have thought that serious objectives would be raised by most countries. If it is the means itself, then the requirement would be no more than a negative prohibition on countries conducting activities that are detrimental to the interests of other countries. Monserrat, for example, in advocating the view that all space activities must be subject to the “global public interest”, suggested that this “does not admit any form of exploitation and use of the outer space [that is] capable of causing bad and damage [*sic*] to a country and to people, to the whole humankind or to part of it, as well as *hurting their legitimate interests*”.³⁶

This idea of Article I being regarded in practice as being no more than a moral, instead of a legal, obligation is a view that is shared by some other commentators. Cheng, for example, observed that:

Insofar as the preparatory work of the Treaty is concerned, the discussions which took place on several articles of the Treaty clearly showed that its draftsmen hardly intended this part of the Article I to be anything more than a declaration of principles from which no specific rights of a legal nature were to be derived, even though it may give rise to a moral obligation.³⁷

Although this formulation may be considered the most favourable, especially in the context of private and commercial space activities, it must be noted that there are two *indicia* to suggest that the requirement actually imposes a positive duty. The first is that the requirement in Article I utilises the plural form “interests” instead of the singular, which may indicate that the drafters intended this to involve more than “just the vague, general ‘interest’ of all countries”.³⁸ This may be taken to mean that a particular set of interests of all countries is to be taken into account in the conduct of space activities. The second is that while Article I may be considered to be “an aspiration couched in very

³⁶ Monserrat Filho, *Why and How to Define “Global Public Interest”* (2000) 43 PROC. COLL. L. OUTER SP. 22 at 24. Italics added.

³⁷ Cheng, *STUDIES IN INTERNATIONAL SPACE LAW* (1997) at pp. 234-235.

general terms which could not be specifically implemented without further elaborations and guidelines”, the Moon Agreement may arguably constitute the further elaborations and guidelines to give effect to the “interests and benefits of all countries” requirement.³⁹ Accordingly, even though the Moon Agreement has not won widespread acceptance as the *means* of implementing the requirement, it does not prejudice the view that Article I of the Outer Space Treaty may nevertheless require implementation in practice.⁴⁰

The foregoing analysis may be crystallised to produce at least three possible outcomes and the corresponding applications on the exploration and extraction segments of a commercial prospecting operation on celestial bodies:

- (4) *Article I is a generalised mission statement that does not impose positive and specific duties.* If the requirement of “benefits and interests of all countries” is to be regarded as a generalised mission statement for all space activities instead of the imposition of a positive and specific duty, then clearly such commercial activities may be considered positive developments for all countries.
- (5) *Article I creates an obligation that is imposed on the activity rather than the results derived thereof.* If the provision does impose a specific and positive duty but such a duty is imposed on the activity instead of the results derived thereof, then the duty may be interpreted as a negative duty of ensuring that the activity does not cause a detriment to any other country. In such a case, such activities would not have much difficulty

³⁸ *Ibid.*

³⁹ *Ibid.*, at 322.

⁴⁰ (1979) 1363 U.N.T.S. 3; 18 I.L.M. 1434.

fulfilling such an obligation, though this would be different if the activity progressed to the large scale extraction of mineral ores from celestial bodies.

- (6) *Positive duty to share the benefits derived from space activities.* If the requirement under Article I is to be interpreted as an obligation to share the resulting benefits derived from space activities, then the Moon Agreement is an example, though an unacceptable one, of the practical means of fulfilling this obligation. It follows then that the obligation does not arise until that country or its private entities have gained a benefit that is capable of being shared on an equitable basis.⁴¹ In the context of a commercial space mining venture, such a benefit would be produced only when processed ores are sold on world markets and thus the obligation would have no application on the exploration and prospecting segments of the venture. This interpretation is supported, for example, by the stipulation in the Moon Agreement that there is to be an “equitable” sharing in the “benefits” derived from the exploitation of mineral resources extracted from celestial bodies.⁴²

Lawfulness of Commercial Use Generally

Kerrest noted that commercial uses of space, in general, pose problems mostly related to appropriation and that “sharing the common space resources, orbits and frequencies, establishing legal monopolies ... through patent laws ... may be in breach of space law”.⁴³ Presumably, this is the result of the “for the benefit and in the interests of all countries” requirement in Article I of the Outer Space

⁴¹ Moon Agreement, Article 11.

⁴² *Ibid.*, Article 11(7)(d).

⁴³ Kerrest, *supra* note 35, at 199.

Treaty. Arguably, the occupation of orbits and frequencies and the extension of intellectual property rights in outer space may be, to some extent, in contravention of the requirements under space law.

It may be seen that commercial space activities may have some difficulty falling within the requirements of Article I. This is because commercial activities are, by definition, undertaken with a view to profit and such profits are to be shared by the members of the private concern or the relevant domestic governmental agency and not by all countries. Consequently, the benefit to be obtained by *all* countries must be assessed qualitatively and quantitatively in some manner in order to satisfy the requirements imposed under the Outer Space Treaty. There are at least four possible views on the legality of commercial space activities in general:

- (1) all commercial activities are, by definition, not for the benefit nor in the interest of all countries and are thus unlawful under the Outer Space Treaty;
- (2) commercial activities in space are lawful only where they provide, in conjunction to their commercial activities, some element of “community service” to countries at no or nominal cost, as is the case with some intergovernmental satellite organisations;⁴⁴
- (3) commercial activities in space are lawful only where the goods or services they provide may be purchased by any governmental or private consumer, regardless of national origin, on a non-discriminatory basis, as provided for in the case of remote sensing activities of the Earth;⁴⁵ or

⁴⁴ Convention on the International Mobile Satellite Organisation [2001] A.T.S. 11, Article 3; and International Telecommunications Satellite Organisation, Agreement Relating to the International Telecommunications Satellite Organisation, at <http://216.119.123.56/dyn4000/dyn/docs/ITSO/tpl1_itso.cfm?location=&id=5&link_src=HPL&lang=english>, last accessed on 13 January 2005, Article III.

⁴⁵ Remote Sensing Principles, Principle XII.

- (4) commercial activities in space are lawful provided that the activity does not, by its nature, structure or form, prevent any other entity from undertaking the same activity.

From existing state practice, it is doubtful that commercial space activities would *per se* be unlawful or that some element of “community service”, similar to those originally provided by INTELSAT and INMARSAT, would be required under international law.⁴⁶ This is because to do so would be to suggest that the requirement under Article I prescribe a positive duty on the sharing of “benefits” derived from activities in outer space and, as discussed above, this is a view that had not found much acceptance among both countries and legal commentators.

It is arguable that, although there is no positive duty to share the derived benefits from non-exclusive commercial space activities, the fruits of such activities must be available for purchase by all potential customers on a non-discriminatory basis. Although the principle of non-discrimination contained in Article I of the Outer Space Treaty relates to the freedom of exploration, use and access by countries and not to the “benefit and interests of all countries” requirement, such an extension of the non-discrimination principle is not without precedent. For example, in the Principles Relating to Remote Sensing of the Earth from Outer Space, Principle XII provides that the sensed country shall have access to the primary and processed data “on a non-discriminatory basis on reasonable cost terms”. Admittedly, the sensed country in the case of remote sensing is in a unique position but arguably this is remedied by the requirement that the access is to be given on reasonable cost terms. In the case of other commercial activities or in considering the interests of other countries, perhaps the commercial operator should be entitled to charge unreasonable cost terms provided it is done in a non-discriminatory manner.

⁴⁶ Convention on the International Mobile Satellite Organisation and Agreement Relating to the International Telecommunications Satellite Organisation.

In terms of monopolistic and other exclusive practices, however, they would be lawful under Article I, subject to the caveat that such practices restrict only the *means* to access or use outer space but not to the *space* or the *use* itself. For example, a patent on a particular asteroid mining technology merely restricts one particular method of asteroid mining but does not inhibit the freedom of other countries to mine asteroids. Accordingly, there would be no breach of the requirements under Article I of the Outer Space Treaty.

Freedoms Prescribed under Article I of the Outer Space Treaty

The other requirements imposed under Article I of the Outer Space Treaty may be referred to collectively as the four fundamental freedoms in space law: the freedom of exploration, the freedom of use, the freedom of access to all areas of all celestial bodies, including the Moon, and the freedom to conduct scientific investigations. It is somewhat difficult to distinguish between “exploration” and “use” of outer space and celestial bodies, for although the two terms may, on first appearances, have very distinct meanings, it is difficult to determine their precise differences in applicability and practice of these freedoms. As Böckstiegel has observed:

At first sight, the distinction between “exploration” and “use” may seem sufficiently clear. Indeed in connection with most space activities little doubt may come up which of these two terms is applicable. First doubts appear however, because the Outer Space Treaty speaks of exploration “of outer space”. This wording could be interpreted to mean that space must be the object of the exploration. The consequent would be that the great part of research which has to take place “in space” in view of the specific physical conditions there, but which has as its object specific materials, would not be covered and might only be considered as “use” of space.⁴⁷

⁴⁷ Böckstiegel, *Reconsideration of the Legal Framework for Commercial Space Activities* (1990) 33 PROC. COLL. L. OUTER SP. 3. Böckstiegel also observed at 4 that the Outer Space Treaty refers only to exploration *of* outer space and not exploration *in* outer space, though this author is of the view that the difference between the two, in practical terms, would be subtle at best.

It is conceivable that the distinction between “exploration” and “use” is the classical one as applied to the Polar Regions of the Earth, where “exploration” refers to scientific research while “use” relates to the practical implementation of this research or of natural resources.⁴⁸ This definition would nevertheless produce difficulties for the present study, as arguably mineralogical prospecting activities could fall into either “exploration”, as merely research on the geology and mineralogy of a particular area of a celestial body, or “use”, being a commercial space activity driven by the motivation of financial gain.

In any event, such delineation may not be sustainable in law considering the third paragraph of Article I refer to countries having a “freedom of scientific investigation” and so “exploration” must have a meaning other than scientific research. This is further supported by Article IX of the Outer Space Treaty, which provides, among other legal requirements, that countries:

shall pursue *studies* of outer space, including the Moon and other celestial bodies, and conduct *exploration* of them so as to avoid their harmful contamination and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter⁴⁹

This is clearly inconsistent with the proposition that “exploration” of outer space means scientific research in outer space, as the drafters of the Outer Space Treaty are unlikely to have repeated themselves in such a blatant fashion. Consequently, other possible definitions for the word “exploration”, vis-à-vis those for “use” and “scientific investigation”, must be contemplated. For instance, if one chose to consider the results from activities involving “exploration” and “use” rather than the means themselves, then a distinction may be drawn on the benefits to be derived from such activities. Specifically, “exploration” may be defined as activities in space that do not produce tangible benefits while “use” involves activities that produces tangible benefits. For example, the Apollo-Soyuz mission

⁴⁸ *Ibid.*

was not really intended to undertake scientific research nor did it produce any tangible benefits and thus may be classified as an “exploration” activity instead of an “use” of space. On the other hand, the recent launches of reusable crewed launch vehicles are activities that do produce tangible benefits or at least may potentially do so.

In the context of Article I of the Outer Space Treaty and commercial prospecting of celestial bodies, the legal distinction between “exploration” and “use” is not of much practical consequence. This is because in both cases the Outer Space Treaty provides for the prescription of a freedom for all countries. Consequently, perhaps it may be presumed that the freedoms of exploration and use require no more than a negative duty imposed on countries not to inhibit the exploration and use of outer space of other countries. This, of course, may be different in the case of commercial mining in contrast to prospecting on celestial bodies.

In the case of the freedom of access, it is important to observe that this expressly relates to areas on celestial bodies only, in contrast to the freedoms of exploration and use which are applicable to both outer space *sensu stricto* and celestial bodies. Utilising the formulation illustrated above for the freedoms of exploration and use, it is arguable that the freedom prescribes a corresponding duty on countries not to undertake any activity that would exclude access on the part of other countries to a particular area on a celestial body. In other words, the obligations imposed under the freedoms of exploration and use are *logistical* ones that prohibit activities that exclude other countries from undertaking the same activity. On the other hand, the obligation imposed under the freedom of access to all areas of celestial bodies is a *geographical* one that prohibits activities that exclude other countries from accessing the same area on a celestial body. While it is usually unnecessary for

⁴⁹ Italics added.

countries to assert exclusive access to areas on celestial bodies for the purposes of prospecting, this is undoubtedly essential if large scale commercial mining is to take place in any area of a celestial body.

If the conclusions above are the accepted effects of the freedoms provided under Article I, the practical question would be what level of activity would amount to an inhibition of another country's freedom to explore or use outer space or access an area on a celestial body. As discussed previously in the context of exclusive and monopolistic commercial practices in space, it is arguable that any activity that purports to exclude other countries from a particular type of activity or access to a particular area on a celestial body would contravene the freedoms contained in Article I of the Outer Space Treaty. Conversely, in order not to contravene the freedoms, a lawful activity must not prevent another country from undertaking a particular type of activity or for accessing a particular area on a celestial body.

The scope of such an obligation would be a question of degree. If the obligation is applied strictly, for example, then the occupation of an orbital position around the Earth by any satellite, other than on the geostationary orbit, would infringe the freedoms of exploration and use as this would prevent another satellite from providing coverage to a particular area for a particular activity.⁵⁰ On the other hand, if applied too broadly, the prohibitions prescribed by the freedoms may have very little legal effect, though their moral effects may be undiminished.

⁵⁰ The occupation of orbital slots on the geostationary orbit would not only occupy a particular orbital space to the exclusion of other satellites but also a particular radio frequency to be used for its transmissions: Henri, *Orbit/Spectrum Allocation Procedures Registration Mechanism* (2004), paper presented at the International Telecommunication Union Biennial Seminar of the Radiocommunication Bureau, 15-19 November 2004, in Geneva, Switzerland. However, a persuasive argument may be made to support the view that the body of laws and regulations created by the International Telecommunication Union to regulate the use of the geostationary orbit and corresponding radio frequencies amount to a *lex specialis* to which Article I of the Outer Space Treaty has limited application.

The other provisions of the Outer Space Treaty and present state practice appear to favour the latter position or at least an approach that is closer to that particular end of the “stringency continuum”. For example, Article XII of the Outer Space Treaty provides that:

All stations, installations, equipment and space vehicles on the Moon and other celestial bodies shall be open to representatives of other State Parties to the Treaty *on a basis of reciprocity*. Such representatives shall give reasonable *advance notice* of a projected visit, in order that the *appropriate consultations may be held ...*⁵¹

Even in a restricted form, the freedom of access to all areas of celestial bodies nevertheless poses a significant legal obstacle for a commercial space mining venture. This is because mining activities, especially in the large scale extraction of ores, necessarily require some degree of exclusivity over the area in which the mining activities are to take place.

Specific Provisions of the Moon Agreement

The Moon Agreement contains a specific provision concerning the extraction of mineral samples from the surface or subsurface of the Moon and other celestial bodies in the Solar System.

Specifically, Article 6(2) provides that:

In carrying out scientific investigations and in furtherance of the provisions of this Agreement, the State Parties shall have the right to collect on and remove from the Moon samples of its mineral and other substances. Such samples shall remain at the disposal of those State Parties which caused them to be collected and may be used by them for scientific purposes. State Parties shall have regard to the desirability of making a portion of such samples available to other interested State Parties and the international scientific community for scientific investigation. States Parties may in the course of the scientific investigations also use mineral and other substances of the Moon in quantities appropriate for the support of their missions.

Specifically, it appears that Article 6(2) provides several rights to countries:

⁵¹ Italics added.

- (1) the right to collect on and remove from celestial bodies samples of its mineral and other substances *in carrying out scientific investigations* and in furtherance of the provisions of the Moon Agreement;
- (2) the right to retain the samples collected and used *for scientific purposes*;
- (3) the right to share a portion of a sample collected with the international scientific community *for scientific investigations*; and
- (4) the right to use mineral and other substances on the Moon in quantities appropriate for the support of missions of *scientific investigations*.

In each case, the right provided under Article 6(2) is confined to the purposes of scientific investigations. In the context of the present study, the obvious next step would be to consider whether, as a matter of international law, exploration and prospecting of mineral resources can be considered “scientific investigation”. To some degree, the geological and mineralogical study of celestial bodies is a necessary part of the “scientific investigation” of the Solar System. For example, the scientific community has continually reaffirmed the value of such mineralogical study to discovering the origins of the Solar System.⁵² At the same time, the conduct of mineralogical studies of celestial bodies for the purposes of commercial prospecting and profit may not be appropriately considered to be part of humankind’s “scientific investigation” of the Solar System. For example, it would be difficult to consider the drilling of Arctic ice shelves by private companies in search for oil deposits as being an effort aimed at scientific advancement.

⁵² See, for example, Cameron, *Origin of the Solar System* (1988) 26 ANN. REV. ASTRONOMY & ASTROPHYSICS 441; and Suess, *Chemical Evidence Bearing on the Origin of the Solar System* (1965) 3 ANN. REV. ASTRONOMY & ASTROPHYSICS 217.

The difficulty in maintain such a clear delineation lies in the practical reality that the scientific and commercial sectors of the space community are intertwined and greatly interdependent. In practice, any mineralogical study on the surface or subsurface of a celestial body, no matter how scientific in nature and how broad the coverage of the study, the data obtained may give rise to mining operations in a specific part of the surface or subsurface of the celestial body with a view to commercial gain.⁵³ Similarly, a commercial mineralogical prospecting activity on a celestial body, no matter how capitalist oriented the mission and how confined the geographical scope of the prospecting is, may give rise to the production of valuable data that may be shared to assist in the scientific investigation of that celestial body.

Since it is difficult to reach a conclusion by practical differentiation between commercial prospecting and scientific investigation, it may be prudent to compare and contrast Article 6(2) of the Moon Agreement with similar provisions in other international resource development regimes. For example:

- (1) in the United Nations Convention on the Law of the Sea, “marine scientific research” in the deep seabed is regulated pursuant to Article 143 and Part XIII, while exploration of mineral resources is separately regulated by Article 153 and Part XI;⁵⁴ and
- (2) in the Madrid Protocol on Environmental Protection to the Antarctic Treaty, Article 7 prohibits “any activity relating to mineral resources [in Antarctica], other than scientific research”.⁵⁵

⁵³ See, for example, Predictive Mineral Discovery Cooperative Research Centre, *Utilisation and Application of the Research: Commercialisation and Links with Users* (2002), located at <http://www.pmdcrc.com.au/republish/annrep.html>, last accessed on 20 January 2005.

⁵⁴ (1982) 1833 U.N.T.S. 3; 21 I.L.M. 1261. The effect of these provisions are not affected by the adoption of the Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea (1995) U.N.Doc. A/RES.48/263.

The scope of what would constitute scientific research in relation to mineral resources in Antarctica was further clarified in Article 1 of the failed Wellington Convention on the Regulation of Antarctic Mineral Resource Activities to exclude prospecting and exploration, where:

- (1) “prospecting” is defined to mean activities aimed at identifying areas of mineral resource potential for possible exploration and development, including geological, geochemical and geophysical investigations and field observations, the use of remote sensing techniques and collection of surface, seafloor and sub-ice samples, but do not include dredging and excavations, except for the purpose of obtaining small-scale samples, or drilling, except shallow drilling into rock and sediment to depths not exceeding 25 meters; and
- (2) “exploration” is defined to mean activities aimed at identifying and evaluating specific mineral resource occurrences or deposits, including exploratory drilling, dredging and other surface or subsurface excavations required to determine the nature and size of mineral resource deposits and the feasibility of their development, but excluding pilot projects or commercial production.⁵⁶

If the analogies between celestial bodies and the deep seabed and between celestial bodies and Antarctica may be maintained, then it would be reasonable to assume that term “scientific investigation” in the Moon Agreement would also exclude exploration and prospecting with a view of assessing the feasibility of mineral resource development for commercial gain. In this way, the Moon

⁵⁵ The Antarctic Treaty (1959) 402 U.N.T.S. 71; and the Madrid Protocol to the Antarctic Treaty on Environmental Protection (1991) 402 U.N.T.S. 71.

⁵⁶ Article 1 of the Wellington Convention on the Regulation of Antarctic Mineral Resource Activities (1989) 27 I.L.M. 868.

Agreement may be seen as an obstacle to potential mineralogical prospecting activities on celestial bodies in the future.

AMENDING THE MOON AGREEMENT

There is a commonly-held view that the two major impediments to the general acceptability of the Moon Agreement are the common heritage of mankind principle as embodied in Article 11 of the Moon Agreement and the further lack of substantive certainty created by the deferring nature of Article 11(5) in foreshadowing the creation of an international regime when commercial exploitation of celestial resources become feasible instead of actually creating one.⁵⁷ It is the regrettable opinion of the author that the amendments proposed by the International Law Association, as discussed by Dr. Frans von der Dunk, does not adequately address either of these two concerns. To that end, it is pertinent to discuss the amendments in further detail.

Firstly, the inclusion of “commercial exploitation and use” in the province of all mankind, to be “carried out for the benefit and in the interest of all countries, irrespective of their degree of economic or scientific development” has the potential effect of replacing the vague language embodying the common heritage of mankind principle in Article 11(5) with even vaguer language. While activities involving the “exploration” and “use” of the Moon usually do not cause financial benefits to arise, such benefits do follow as a matter of course from commercial activities. The need to carry on commercial activities for the benefit of all countries may well have the effect of requiring the sharing of “benefits” derived from such activities with all countries, thus effectively embodying the common heritage of mankind principle without actually intending to do so.

⁵⁷ See, for example, Lee and Freeland, *Property and Mining Rights for Lunar Mining Operations in the Absence of International Consensus on the Moon Agreement* (2003), paper presented at the International Astronautical Congress, 29 September – 3 October 2003 in Bremen, Germany.

Secondly, the addition of an exception for commercial exploitation or use to the non-appropriation principle in Article 11(2) leaves open the question of whether commercial exploitation and use in accordance with Article 11 would give rise to national appropriation. If the proposed amendments to Article 11(5), as discussed below, are adopted, then such an amendment to Article 11(2) would be unnecessary in any event. It may actually be more appropriate to replace the phrase “by any other means” with “by any other means including any commercial exploitation or use that is in accordance with this Article”, to ensure that such activities do not give rise to the possibility of appropriation.

Thirdly, it is difficult to see what effect the removal of the phrase “natural resources in place” has, especially if it is deemed a “logical consequence of defining the Moon and all its aspects as province of all mankind”. One may suggest that leaving the provision unamended may better reflect the intention of the provision to prevent private property rights in all parts of the Moon and celestial bodies.

Fourthly, the proposed amendments to Article 11(5) and (6) fail to address the two primary concerns discussed above in the following aspects:

- (3) the “rights” and “interests” of other States would include the right to have commercial activities in space be “carried out for the benefit and in the interest of all countries”;
- (4) the complete elimination of the common heritage of mankind principle is unlikely to secure widespread acceptability among developing States;
- (5) the paragraph continues to defer to a later time the creation of an international regime and, with the removal of references to when the commercial exploitation is “about to become feasible” and the inclusion of a transitional provision makes it very unlikely that such an international regime would be in place by the time commercial exploitation of the Moon and other celestial bodies does become feasible;

- (6) it is unclear what “rational” management of mineral resources means.

CONCLUDING OBSERVATIONS

It is respectfully submitted that what is needed for a long term solution to the present impasse over the Moon Agreement is one that recognises the following elements:

- (1) a compromise between the two extreme positions on the common heritage of mankind principle rather than the simple adoption of one of the two positions;
- (2) the immediate establishment of an international regulatory regime that sets out the principles, conditions and terms of commercial exploitation of mineral resources;
- (3) setting out the nature, composition, funding, powers and functions of any international regulatory body created to administer the regulatory regime; and
- (4) to take into account not only the possible commercial exploitation of the Moon but also other celestial bodies and the peculiarities associated with the exploitation of such bodies, such as comets and Near Earth Asteroids.

One of the difficulties that will inevitably arise is the need for common acceptance between the States that are party to the Outer Space Treaty and those who will agree to be party to the Moon Agreement. Otherwise, it may be necessary to codify the effect of the two treaties on States that chose to ratify the Outer Space Treaty but not the Moon Agreement, where such a State would want to enforce the terms of the Outer Space Treaty as unmodified by the Moon Agreement or where a State undertakes the commercial exploitation of the Moon and other celestial bodies without complying with the Moon Agreement to which it is not a party. Consequently, it may in fact be necessary to abandon the Moon Agreement and instead amend the Outer Space Treaty.

Mining of the Celestial Bodies and Need for International Regulations

By

V.S. Mani

I congratulate Prof. Franz Van der Dunk for his excellent paper: I agree with him in many respects, and I do not in certain others.

I am confining my comments to mining of the celestial bodies for commercial purposes, excluding scientific investigation or sampling.

I THE DEBATE OVER ARTICLES II & IV

The debate over whether the Space Treaty permits non-governmental mining of celestial bodies has revealed divergent interpretations on Articles II and VI of the Space Treaty, 1967 - one following the guidelines for such interpretation provided in Articles 30-31 of the Vienna Convention on the Law of Treaties 1969, the other constructed of false logic, one based on the basic policy norms enshrined in the Space Treaty, and the other an artificial, unduly stretched interpretation of the provisions of that treaty with predisposed objective of defeating the policy norm embodied in the treaty and you cannot do it except by amending the treaty.

II NEED FOR INTERNATIONAL REGULATIONS

Let us look at Articles II and VI of the Space Treaty. Article II comes from the Antarctica Treaty, 1959, normatively the 'Mother' of the Space Treaty whose Article 4 embodies the non-appropriation principle for good historical reason. It is remarkable to note that to date nobody has claimed that Article 4 of the Antarctica Treaty permits private exploitation of Antarctic resources while prohibiting appropriation activities on the part of states - there are in fact proven abundant resources right here, on the earth! Article II of the Space Treaty says exactly what it says. It says so because a state-based normative network can alone provide an orderly development of space exploration and exploitation of celestial resources.

Article VI of Space Treaty makes it clear, by imposing on states the responsibility for all national activities. This is based on a more fundamental principle of international law - each state shall ensure that its territory is not used in any way detrimental to others (Corfu Channel case) or to international areas (Article 21 of Stockholm Declaration, 1972). This principle evidently encompasses all national activity, including space activity. It is well known that jurisdiction of a state encompasses all space objects originating from it. For more on attribution of responsibility and liability, we should read the ILC final draft on state responsibility 2001. In the light of ILC draft, there is no space for a controversy over "appropriate" state, as what is an "appropriate state" is determined contextually subject to the rules of attribution of liability.

It may be noted further that under Article VI of the Space Treaty, a state has the responsibility in respect of not only all national activities in outer space (including those of non-governmental entities) but also acts of international organisations of which it is a member. If an international organisation tends to commit an illegal act, all member states have a collective duty to prevent it and if it succeeds in doing it, all member states have a collective liability to repair it – quite possibly based on the principle of solidary liability for all such states. (This principle was advocated by Nauru in the certain phosphate lands in Nauru case). This is something unique to Space law – see also Space Liability Convention 1971, Article 22(3). The emphasis is on holding several states responsible. It is obvious there is need for international regulations to govern such situations.

During the Space Law Workshop, Daejeon, Korea held in October 2003, there was a serious debate on whether International Regulations for governing commercial activities in outer space, or whether national regulations would suffice. I would strongly favour international regulations for the following principal reasons:-

(1) Article II non-appropriation principle can only be effectively enforced in terms of standards set by international regulations. Mark the wording of Article II - no appropriation “by means of use or occupation, or by any other means”.

Environmental and safety concerns such as those underscored in the NPS Principles would logically anticipate international regulations. Analogous principles reflected in the safety and environmental regulations of ICAO for international civil aviation highlight the comparable precedents.

ILC’s final draft articles on state responsibility for internationally wrongful acts and also the draft articles on Liability of States for the Injurious Consequences of Acts not prohibited by International Law would call for international standards and regulations.

The emerging international norms for protection of consumer rights would require internationally accepted standards for transboundary implications of products and process liability.

(5) International distributive justice demands of international regulations. Dr. Jasentuliyana’s presidential speech spoke of poverty and other deprivations as an international reality that needs to be taken into account by space law as well. The concept of Common Heritage of Mankind – it should be Common Heritage of Humanity – embodies principles seeking to address precisely this ‘reality’. However, CHM has been a much misunderstood concept in the West. President Reagan wrongly condemned it as a symbol of international communism in 1982. It was a devil incarnate for the worshippers of capitalism. In fact, we need to get away from the Roman Law concepts of *res nullius* and *res communis* when it comes to what Brownlie calls “use of common amenities” including use of outer space.

CHM was a product of UNESCO Jurisprudence of 1950’s on the Cultural and Natural Heritage which later found expression in the 1972 UNESCO Convention. III UNCLOS debates were triggered in 1967 with a famous Arvid Pardo speech,

against the background of the excesses committed in terms of over-fishing and the 'rape' of the oceans by the distant water fishing nations under the guise of traditional *res communis* doctrine. *Res communis* was ripped off its humanity and equity that Grotius had in his heart when he proclaimed the oceans to be God's gift to humankind. It now stood to justify first-come-first-serve rule leading to overexploitation of resources. It now justified grabbing of marine resources by those who could do so by virtue of superior technology even along with coasts of those who thought they could exploit them sustainably and even on a later date.

CHM is germane of the cultures of many ancient communities. Even now the land laws in India and many other ancient communities provide for the concept of "community property" being non-appropriable: but its use regulated by the community. The Roman law in fact fails to reflect such ancient values: Ambassador Coca tried his best to bring into law labels like *res humanitas* or *humanis* and trusteeship concepts.

Has CHM really been the reason for failure of the Moon Treaty to attract ratifications? Studies have shown that there are a number of non-legal reasons that inveigh the minds of states while deciding to postpone ratification of a Treaty.

It is a wrong thesis that CHM prohibits private activities. The Law of the Sea Convention 1982 read with the 1994 Implementing Agreement that facilitated US participation clearly provides for private activities alongside state sponsored activities.

CHM seeks to preserve the positive aspects of what Grotius originally wanted *res communis* to mean: justice and equity. So let us retain CHM, but elaborate its contextual application to outer space resources.

Even in the condition of free competition there is a need for regulations, in order to prevent, overlap or conflict of interests and to set and monitor rules of the game.

Further, security interests of States will call for international regulations to ensure a balance of interest of all actors.

State practices in respect of civilian space activities are divergent. There are states like USA that promote privatisation. There are states like India, Russia and China where state funding and state control are the necessity on the ground. Private players are few and far between in these countries. Allowing private players from a few states will only accelerate the economic and technological gaps between nations.

Dr. Klaus Hess made a significant concluding statement yesterday: "Monopoly is bad and free competition is good". Unfortunately, however, monopolies rule the roost today.

III SUBMISSIONS

Finally,

I agree that the Moon Treaty must be the basis for future negotiations.
I do not agree with Franz on two things:- (a) Deletion of CHM references; (b) Deletion of Article 11 (7) reference to equitable sharing. Article 11 (7) only reflects the general law on common amenities that highlights two principles:- (a) Equitable sharing and (b) Rational Management (see for instance the Convention on Non-navigable Uses of International Watercourses 1997).

Comments on Frans von der Dunk's paper "The Acceptability of the Moon Agreement and the Road Ahead"

By

Jonathan F. Galloway

Professor Emeritus

Lake Forest College, Lake Forest, Illinois

Frans points out that the Moon Agreement has recently been ratified by three more states bringing the total number to twelve. It is often noted that these states are not space powers, but I would move away from that distinction. All these states are involved in space through bilateral and multilateral arrangements. We should say that there are large space powers and small space powers. It should also be pointed out that the twelve represent all six populated continents on earth.

On the other hand, the twelve are not likely to go to the Moon or other celestial bodies except in cooperation with others.

What makes an assessment of the Moon Treaty timely is President Bush's 2004 Vision speech and the subsequent reconfiguration of NASA's missions along the lines of going back to the Moon and on to Mars.

Harvesting the Moon for rocket fuel and oxygen is mentioned. This naturally makes a space lawyer think of establishing a regime for exploiting the Moon's resources according to Article 11(5) of the Moon Treaty. The thought, of course, is very far from political feasibility. President Bush is interested in lifting the American spirit and U.S. leadership and not the Common Heritage of Mankind (CHM).

Others have recently opined that we must go to the Moon and elsewhere in the solar system in order to assure the survival of the human species. Stephen Hawking promoted this idea in Hong Kong earlier this month. I am also reminded of another physicist's thoughts on this matter - Gerard K. O'Neill. He advocated building space colonies through the use of mass drivers on the Moon.

In order to bring these lofty ideas down to earth in terms of establishing a legal framework, von der Dunk has proposed that the Moon Agreement be amended to eliminate the CHM concept and re-invigorate "the province of all mankind" concept from the Outer Space Treaty. I reluctantly agree with this radical approach because, otherwise the Moon Treaty will become the orphan of ideological diatribes. I say reluctantly because in a previous paper I elaborated

on the history of the CHM concept going back centuries in political philosophy to John Locke and others.

Also, I support Frans' amendments insofar as they make clear the IISL position that one cannot sell property on the moon.

Frans has proposed creative and insightful amendments to the Moon Agreement. They point the way to future development of space law by amending treaties. (Who should take the lead on amending the Moon Agreement? COPUOS, or the twelve?) We should also mention other roads ahead: new treaties for instance on the subject of a world space organization; new UN resolutions for instance on space debris; guidelines for interpreting existing law as in the 1994 views on the meaning of the CHM in the Law of the Sea Convention; voluntary codes of conduct which could become state practice and customary international law over time, perhaps the preferred way to go on the matter of space debris; and case law.

I believe it is the responsibility of the IISL to explore all these alternative paths in our Colloquia, in our workshops and in cooperation with Institutes of Air & Space law in Cologne, Leiden, and Montreal. Thus will the wider space law community be engaged in developing space law and the rule of law - a continuing work of love to which my mother has devoted her career in cooperation with her many friends and colleagues around the globe.

Rapporteur's Notes for Session 5

By
M. Lucy Stojak

Frans von der Dunk started by dedicating his paper to Eileen Galloway. He then proceeded to summarize his paper. He stated that the Moon Agreement was back in business or at least, back up for discussion due to two (2) main reasons. The first being the recent ratification of the Moon Agreement by Kazakhstan (2001), Belgium (2004) and Peru. The second being the New Vision for Space-Initiative launched by US President Bush and the "common heritage of mankind" issues raised by this declaration.

He underlined the difference in terminology between the terms 'private' and 'commercial', noting that 'private' refers to the legal classification of an actor (as opposed to public which comprises governments) and 'commercial' which refers to the main driving force behind such an activity (as opposed to other drivers such as scientific or military ones). The author stated that when thinking of exploitation of the natural resources of the Moon, one is really thinking of what can be referred to as 'hard rocks', as opposed to 'space' used for telecommunications, for example.

As natural resource exploitation will be the main focus for the near future for commercial and private interest in the Moon, the question of the status of the Moon from a territorial perspective becomes relevant. Based on Article II of the Outer Space Treaty, the author notes the exclusion of the applicability of territorial sovereignty to outer space or any particular part thereof. He further notes that because the Moon can never become part of any State's national territory, the concept of terra nullius also does not apply to outer space or any particular part thereof.

Article II read in conjunction with other provisions of the Outer Space Treaty such as the freedom of exploration and use of, and of scientific investigation in outer space, lend support to the application of the concept of terra communis to outer space. Furthermore, he noted that outer space was declared to be the 'province of all mankind' and that this concept helped to define the status of the exploration and use of outer space. As such, the classical notion of the terra communis concept went with the presumption of complete freedom of activities unless explicitly prohibited.

The Moon Agreement introduced a new concept, that of the 'common heritage of mankind (CHM)'. The CHM pre-supposes both technology sharing and material benefit sharing. This is fundamentally different from the concept of the 'province of mankind'.

The author then proceeded to a more detailed discussion of the Moon Agreement and its provisions. The Moon Agreement elaborated on the provisions of the Outer Space Treaty: it specifically refers to the Outer Space Treaty and as such, to the concept of terra communis, and reiterates and reconfirms the application of

the 'province of mankind' concept to the exploration and use of outer space. The Moon Agreement introduces a new concept for the Moon and its natural resources, namely that of the CHM. The concept has yet to be elaborated upon yet in the 1970's when this Agreement was drafted, States were not then fully aware of the scope of the CHM with respect to future resource exploitation. The CHM has given rise to much controversy and reference is often made to the Law of the Sea Convention (LOS) and its application of the CHM. The question which therefore needs to be answered is whether the CHM is a 'show stopper' in terms of having a larger number of major space faring nations ratify the Moon Agreement. Is it necessary to keep the CHM clause in the Moon Agreement to protect and justify public international interests in the Moon or are there better ways to achieve this goal.

The author argues that the Moon Agreement remains the only logical and feasible point of departure for discussion on the establishment of a fair and transparent international legal regime for any future lunar resource exploitation. The principles and general rules contained in the provisions of the Moon Agreement when read together, give a general indication of what such a regime should resemble.

Article 9 of the Agreement unequivocally establishes the freedom of establishing manned and unmanned stations on the Moon, so long as the freedom of access to all areas of the Moon is not unduly obstructed. Article 12 reiterates the well established principles first elaborated upon in the Outer Space Treaty and expanded upon by the Registration Convention, namely that States retain jurisdiction and control over their personnel and relevant hardware. This provision is of key importance as it provides States with the legal means to regulate certain types of private commercial space activities. Article 14 refers back to the general provisions of the Outer Space Treaty and the Liability Convention. Thus, States bear international responsibility and international liability for 'national activities' on the Moon. These provisions preserve the public interest of States and ensure that they can be held accountable on the international level for certain private commercial activities.

The author further argues that other provisions of the Moon Agreement are relevant to future 'commercial space activities' though no reference to these terms are contained per se within these provisions. He argues that reference to the term 'use' can over time lead to an interpretation whereby 'use' could include 'exploitation' as well. He pointed to Article 2 which States that all activities on the Moon (explicitly including use and implicitly including exploitation) must be in conformity with international law and shall be undertaken with due respect for interests of all states. He noted that Article 4 provides that the exploration and use of the Moon shall be the province of mankind. As such, if the province of mankind is to be seen as an elaboration of the concept of terra communis, does this not imply that such activities are allowed in principle until a prohibition can clearly be discerned or are these activities prohibited until clearly allowed under certain conditions? Furthermore, Article 5 and 7 provide that states shall take measures to keep the harmful consequences of their use of the Moon to a certain minimum. Article 8 further provides that states are free in using the Moon, including its sub-surface. Article 11 is of fundamental importance in the discussion on lunar exploitation and commercial activities. It proclaims the

Moon and its natural resources as the CHM which implies inter alia, the establishment of an international regime for the exploitation of such as natural resources, taking into account the needs of the developing countries. Finally, he points to article 15 of the Moon Agreement which states that in using the Moon, states have certain rights to monitor compliance of other states' activities with the provisions of the Moon Agreement. From the above, the author concludes that there is currently no coherent or dedicated regime applicable to commercial and private exploitation of lunar resources which can be found in either the Outer Space Treaty or in the Moon Agreement.

The author then discussed the future of the Moon Agreement in view of potential exploitation and in view of the New Vision for Space initiative. He notes that the key provision in this regard is Article 11 (5) of the Moon Agreement which refers to the establishment of 'an international regime, including appropriate procedures, to govern the exploitation of the natural resources of the moon as such exploitation is about to become feasible'.

One of the main issues is that the states parties to the Moon Agreement are not among the major space faring countries, in spite of the recent increase of ratifications. The key question is whether a fair and workable body of international legal rules applicable to the Moon might best be served by re-interpretation or amendment to the Moon Agreement, or by deleting the CHM provision from the Moon Agreement and replacing it with an alternative Agreement better able to achieve consensus among a larger number of major space faring nations. The author points out that although it is easier to understand the reluctance of major space faring nations to ratify the Moon Agreement, the same can not be said for why so few developing countries have ratified the Agreement. He concludes that the lack of clarity as to what the CHM concept means is the main reason.

In this regard, the author argues that important lessons can be drawn from development in the law of the sea. He pointed out that on the one hand, developed countries were opposed to the CHM concept as provided for in the LOS, while on the other hand, other provisions of this convention such as the establishment of Exclusive Economic Zone, were very much in the interest of developed countries. To achieve an acceptable compromise, an additional Agreement to the Law of the Sea Convention was added, de facto amending the Convention without the formalities of treaty amendment procedures. The 1994 Agreement preserved the principle of the CHM and its application to the ocean floor but gave developed countries - notably those actively involved in exploitation projects - a larger say in the decisions implementing the principle and relevant procedures in any given case.

The author argues that amendments to the Moon Agreement should first seek to fill well identified gaps such as a clear liability regime, a clear framework for licensing commercial activities. He also made reference to the Resolution adopted at the International Law Association (ILA) Conference in New Delhi in 2002 which aimed at maintaining the CHM principle while trying to ensure that it would not stifle private and/or commercial initiatives with respect to the Moon.

He concluded by stating that the current regime was unclear and unsatisfactory and that bold steps were required.

Comments were then made on the paper.

Paul Larsen asked Dr. Von der Dunk if he recommended adopting a protocol similar to that adopted in 1994 as an additional Agreement to the Law of the Sea Convention, the so called 1994 New York Agreement. Dr. Von der Dunk answered that in his opinion, there were only 2 options either to delete the CHM concept from the Moon Agreement or at the very least, follow the LOS approach.

Professor Mani asked whether there were any precedents in international law where reviews of treaties proved to be useful. He also noted that the Outer Space Treaty has not prevented commercial activities. To the last point, Frans von der Dunk replied that telecommunications make use of frequencies and the spectrum as opposed to 'hard rocks' or resources. He noted that the ITU had established a regime for the efficient use of these resources and that therefore the Outer Space Treaty did not hinder telecommunication activities but that a specific regime was set up by the ITU.

Lubos Perek questioned the need for new treaties as the road ahead. He noted that it would be more useful to study how to make voluntary agreements in the hope that they would then later become part of customary international law. Space debris and planetary protection were cited as topics where this approach might be most helpful. He cited COSPAR as a good example of this approach, stating that it was often easier to achieve cooperation among scientists.

Nandasiri Jasentuliyana discussed the meaning of the CHM. He noted that at the time of the Moon Agreement negotiation, the meaning was clear. Article 11(1) provides that the CHM finds its expression in the Moon Agreement while Article 11(5) states that a regime would need to be established when exploitation became feasible and that such a regime should take into account the interest of space faring nations.

Jean-Francois Mayence identified and discussed the three (3) main reasons why Belgium had recently ratified the Moon Agreement.. The first was primarily of a political nature and reflected Belgium's desire to more actively participate in COPUOS and to better apply the existing five (5) UN space law treaties. The second reason reflects the renewed interest by major space agencies to return to the Moon, and the legal questions that this raises. Finally, Jean-Francois Mayence noted that the Outer Space Treaty does not allow private ownerships, and that from Belgium's perspective, the interest of the CHM concept is that one can have private ownership rights derived from international law.

Jean-Francois Mayence then drew similarities in language used in the Outer Space Treaty, the Moon Agreement, the LOS, Antarctica and various UN General Assembly Resolutions which use similar expressions such as the 'province of all mankind', the 'benefit of all mankind', the 'concern of all mankind', res communis, and the concept of 'global public goods'. The latter term comprises two important parameters, those of non-rivalry and non-exclusivity. He argued in favour of using these terms as a starting point to better define and elaborate

the CHM concept as stated in the Moon Agreement. Finally, he wondered if lawyers could one day propose a new legal theory applicable not only to the Moon but to the exploitation of other resources.

Ricky J. Lee noted that it was not the term CHM as such which created an impasse but rather its practical implementation as stated in article 11(5) of the Moon Agreement which refers to "equitable sharing of benefits". He drew a parallel between the 1994 amendment to the Law of the Sea Convention which maintains the reference to the CHM but changes the implementation of the concept.

He then spoke of a second problematic issue, namely that of private property rights which derive from national laws. He argued that you can not speak of exploitation of resources without having property rights. He further noted that it was the lack of clarity and certainty as to the scope of the term CHM which acted as a deterrent for many states to ratify the Moon Agreement. He discussed the interaction between the Outer Space Treaty and the Moon Agreement noting that if the Moon Agreement was more expansive than the Outer Space Treaty, could a party to the Outer Space Treaty challenge activities of another state who would be party to both of these treaties by arguing that said activities adversely affect outer space? Conversely, if the Moon Agreement is more restrictive than the Outer Space Treaty, there is little incentive to sign and ratify this agreement.

He concluded by saying that making the Moon Agreement may not be the best solution. Amending the Outer Space Treaty or drafting a new comprehensive space treaty might be better solutions.

Professor Mani argued in favour of international regulations to govern outer space activities, without relying on each state to come up with its own regulations under Article VI of the Space Treaty. Article II implied such international regulations. He also pointed out that the state practice vary in allowing non-state entities to independently engage in space activities. The US may give them larger freedom than other states, but in countries like Russia, China and India space activities are mainly state-driven. Evidently, the need for international regulations is clear. Professor Mani is also in favour of keeping the CHM concept. He noted that over the years the original understanding and idea behind the CHM as expressed by Arvid Pardo had been misunderstood. He noted that the international trusteeship concept implied in CHM was readily recognised by President Nixon's Ocean Policy and the initial US draft proposals concerning the international seabed area. The 1994 Implementation Agreement, which was virtually a revision of the Law of the Sea Convention, further watered down the concept of CHM. In other words, the Law of the Sea developments proved the CHM concept would need to be adapted to diverse contexts. This approach does not deny the CHM concept and has the advantage of recognizing one of the core elements of the notion of CHM, namely that of equity. He argued in favour of maintaining the reference to CHM and equity in article 11 of the Moon Agreement. He also noted that per article 18 of the Moon Agreement, the UN is entrusted with the possibility of initiating amendments to this Agreement, not just the States Party to the Agreement. Therefore, there is an opportunity for the UN to play a direct role in initiating action, without waiting for the parties to the agreement.

Jonathan Galloway stated that he agreed with von der Dunk's proposal. He noted that the recent adherents to the Moon Agreement are small space powers. In his view, the Moon Agreement will not receive more ratifications because of the ideological baggage that the CHM concept carries. He also noted that the 1994 amendments to the Law of the Sea Convention had dredged the CHM of all meaning. He then raised different means to find solutions to future resource exploitation. These might include the establishment of a World Space Organisation, the drafting of new guidelines or voluntary codes of conduct which could over time develop into customary international law. Finally, he noted the importance of referring to appropriate case law as a means of finding solutions.

The floor was then open for discussion.

Stephan Hobe noted that the CHM was a concept not a principle, and that article 18 of the Moon Agreement allows and foresees renegotiation of the Agreement 10 years after its entry into force. This was not made use of. He also argued in favour of giving the CHM a distinct interpretation as had been recently put forward by the International Law Association (ILA).

In answer to a previous question dealing with treaties that had been successfully amended, Stephen Doyle noted that the use of protocols to clarify treaties is well established and cited the Kyoto Protocol and Montreal Protocol as good examples.

Ram Jakhu noted that any discussion of the CHM concept should be understood within a global context, and that there was no escaping a global approach in trying to define the concept. In his opinion, the low number of ratifications of the Moon Agreement is attributable to the fact that to date, there were no initiatives to return to the Moon. This situation has changed and the Moon is now "back in business".

Joanne Gabrynowicz noted that several developing countries are now space faring nations. The stark dichotomy between space faring/developed nations and non-spacefaring/developing nations has shifted. This shift presents opportunities in developing space law and ought to be addressed. She also noted that different nations have different definitions of "public", "private" and "commercial", and that these different definitions are not interchangeable. She stated that the CHM concept had much baggage and that the issue of elaborating an international regime for resource exploitation was more a political rather than a legal problem.

Nandasiri Jasentuliyana argued in favour of taking into consideration emerging issues and finding a way forward. He noted that when the necessity arose, agreement could more easily be reached. He quoted the UNIDROIT Convention as an example of necessity being a driving force to reach new agreements. As for the CHM concept, he noted that the only issue was the elaboration of an international regime under article 11 of the Moon Agreement.