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THE DARK SIDE OF THE MOON
The Status of the Moon: Public Concepts and Private Enterprise

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"There's no 'dark side of the moon', really;
Matter of fact, it's all dark..."
J. Driscoll, 1973

Abstract

Thirty years after the entry into force of the Outer Space Treaty most of its principles and concepts have not only found general acceptance as such, but also undergone considerable further development and elaboration. One of the most notable exceptions was the definition of the status of the moon (and other celestial bodies). This was partly due to the circumstances surrounding the drafting, conclusion, entry into force and then ultimate neglect by most states of the Moon Agreement, which was supposed to progressively develop and elaborate this issue. Now that an increasing interest may be discerned in returning to the moon - with the United States as most outspoken example - for its own sake, or as a jumping board for other celestial bodies, it seems worthwhile to revisit the issue of the status of the moon.

The concurrent trend towards increasing privatization of space and space-related activities provides further justification for such an analysis. For example, for any private entity potentially involved in the return to the moon one of the decisive elements for risking huge investments is the measure in which such investments can be guaranteed. This applies to any factual or legal obstacle to freely dispose as such of any physical objects owned or leased by the entity in question. Likewise, it applies to the factual and legal protection of their non-physical rights in objects such as intellectual property rights.

In other words: which particular legal regime applies to these issues is of supreme importance for private enterprise. And which legal regime *can* apply, is in its turn dependent upon international space law, to some extent aided by principles of general public international law, as the most fundamental pertinent body of legal rules. How can laws dealing with the pertinent issue, providing for rights and obligations of private entities such as companies, apply when international space law is a body of law of almost purely public character, with rights and duties exclusively for states?

Here, the issue of the status of outer space and in particular of the moon comes in. Both the international legal regime applicable to outer space as an area, and the international legal regime applicable specifically to the sub-areas of the moon and other celestial bodies do exclude national appropriation and the exercise of sovereignty on a territorial basis. Yet, complications regarding the question of the international legal status of the moon have to be kept in mind. To some extent territorial sovereignty as a mechanism for providing legal regimes still provides a relevant point of departure, and other mechanisms exist as well which may be relevant in this context, such as

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jurisdiction over nationals and the issue of registration of space objects. In summary, as to the legal regime(s) applicable to the moon, for private enterprise a fragmented picture arises, with many gaps and many overlaps.
The conclusion therefore seems to impose itself that a rather dark side of the moon would lie in its lack of a generally acknowledged and agreed legal status on the international legal level. This results in obvious shortcomings on the level of national legislation, as the hitherto most appropriate tool for dealing with private enterprise. Neither does it look like the situation, either in general or for specific purposes such as intellectual property rights, will soon turn decisively for the better.

1. Introduction

Since a few years the moon and other celestial bodies have made some sort of a comeback in the attention of mankind - or at least of the space lawyers community. Following the end of the Apollo programme, discussions amongst the latter had for some time dealt with the future exploitation of especially the moon. The legal problems regarding such exploitation could not be solved, however. At the same time, this applied to the technical problems, which made solution of the legal ones less necessary. Consequently, the moon (and other celestial bodies) became an area in which only a limited number of people maintained interest of a moreover largely theoretical character.
Then, the plans proposed a few years ago by the United States to use the moon as a basis for travel to Mars rekindled general interest. The recent adventures of the United States Pathfinder and Sojourner on the red planet constituted world news. Increasing interest in the moon and celestial bodies was also evidenced by the devotion of a full session of the Thirty-Ninth Colloquium on the Law of Outer Space of the International Institute of Space Law, held in Beijing October 1996, on the subject of property rights in this unique environment.[1]

Legal issues pertaining to the moon and other celestial bodies, moreover, did not remain confined to theoretical debates amongst a few legal expert specialists. A claim by a German pensioner that he held a private title of ownership regarding the moon, and that as a consequence the German government should initiate international action against a Californian businessman auctioning plots of land on the moon, received widespread attention in the media.[2] Likewise, even more recently it has been rumoured that three Yemenites filed a lawsuit locally against NASA for infringing - by means of Pathfinder's and Sojourner's operations - their purported ownership of Mars.[3]

2. The Moon and the Law

Such instances serve to highlight the resurging interest of private persons and private enterprise in the moon and the other celestial bodies. At the same time, it increases the relevance of clarifying to the extent still necessary the public concepts which are ultimately underlying any solution in practice to such problems.
Obviously, legal analysis of the international legal status of the moon should start with the Outer Space Treaty as the often-quoted 'Magna Charta' for outer space and space activities.[4] Before its entry into force in 1967 (or at the earliest until the United Nations Resolutions from 1957 onwards[5] provided for any statement on the law relating to outer space), no law, man-made as that is, could be applicable to outer space.[6]
As a result, international legal rules, like those requiring conscious and substantive acts such as occupation and effective control[7] for sovereignty and ownership, public as well as private (the latter moreover being dependent on the former), of an 'area' did not apply or even exist yet. Thus, claims basing themselves on the situation in 1756 or even of 3,000 years ago were and remain void.

3. The Moon and the Outer Space Treaty

With respect to the Outer Space Treaty, Article II as the most fundamental legal provision specifies the particular application of these very general principles regarding sovereignty and ownership to outer space. It provides that "outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty".
This clause is widely perceived to exclude the applicability of territorial sovereignty to outer space or any particular part thereof.[8] 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.[9] This obviously also applies to the moon, being part of outer space.

4. The Moon as *Terra Communis*

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 recognized that certain geographical areas were in a very principled sense outside the reach of any state's territorial sovereignty.
Following from the foregoing, outer space indeed would qualify as such a *terra communis* or *res extra commercium*, a geographically defined area where freedom ruled in principle just like the high seas.[10] Only the states of the world acting collectively can 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 *inter alia* 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.[11] It also arises out of the general character of the Outer Space Treaty as providing the legal framework for all activities in outer space.[12] The Outer Space Treaty itself provides for the application of international law in general to outer space,[13] as well as for the most important restrictions on the fundamental freedom of space activities.[14]
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 in consequence are directly held accountable for their activities (or those of their entities) towards the other states by means of the principles of international responsibility and international liability.[15]

5. The Moon and the Common Heritage of Mankind-Principle

Relatively recently, however, a second theoretical option for defining the status of an area like outer space, of specific importance in the context of the moon, has 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.[16] The principle as such however may be said to have achieved a measure of acceptance since a few decades.
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.[17] 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.[18]
Those pronouncing the ocean floor the common heritage of mankind on the contrary essentially presumed that any substantial - especially commercial - activities required the consent of the community of states. Consequently, they proposed that an international body should be established to preserve these rights of the world community, and act as a sort of caretaker.[19] Individual states (or their private entities) should only be allowed to undertake commercial activities as long as this international caretaker would see to it that the community of states, especially the developing countries, would actually and materially benefit from those activities.

6. The Moon, Outer Space and the Ocean Floor

Coming back to the area of outer space in general, several traces of this common heritage of mankind-principle found their way into the Outer Space Treaty. The "common interest of all mankind" and the "benefit of all peoples" are major leading principles in guiding the exploration and use of outer space.[20] Furthermore, in its very first sentence, the Outer Space Treaty provides that the exploration and use of outer space "shall be carried out for the benefit and in the interests of all countries".[21] Finally, the hitherto unknown phrase "province of all mankind", as 'defining' the 'status' of exploration and use, is also introduced.[22]
While this phrase indeed seems to echo the common heritage of mankind-principle, most authors as well as the most important spacefaring states agree that its use denies rather than confirms any perceived status of outer space as common heritage of mankind.[23]
At the United Nations Conference on the Law of the Sea, application of the common heritage of mankind-principle to the ocean floor took the form of a rather explicit arrangement regarding any prospective commercial activities in that area.[24] An international body, the Seabed Authority, was foreseen to license such 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, however, of course were not established by the Outer Space Treaty, and, at that point, not even foreseen by the states involved.[25]
Consequently, the provision regarding the "benefit and (...) interest of all countries" should only be interpreted in a 'negative' way. 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' benefits accruing to other states were required to make any exploitation of outer space legal.[26]
The only difference of the status of outer space with the traditional formulation of *terra 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 communis*.

7. The Status of the Moon

These conclusions 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, concerning the stricter regime established in respect of the former when it comes to military or similar activities.[27] This however seems to be of little consequence for any analysis of the legal status of moon or other celestial bodies.

More interesting is the provision that "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".[28] 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. To that extent, full and uninhibited enjoyment of the ownership of hardware, software and know-how, whether by public or by private entities, is also at issue. In the last instance, however, this interesting clause does not of itself result in the moon being the common heritage of mankind.

8. The Moon and the Moon Agreement

Of course, the Outer Space Treaty is not the only treaty to take into account when trying to establish the international legal status of the moon. Precisely because of the special physical character of the moon (and the same obviously applies to other celestial bodies) when compared to outer space as an area, the Moon Agreement was drafted to deal specifically with these celestial bodies.[29] However, while the Outer Space Treaty was ratified by over 90 states, including all those relevant in terms of space activities, the Moon Agreement has only been ratified by nine states, while being signed but not ratified by five more.[30]

Yet, the Moon Agreement is in force, since five ratifications sufficed for that purpose.[31] Consequently, also for those states signatory though no party, the existence of the Moon Agreement under international legal doctrine would result in an obligation not to jeopardize its object and purpose.[32] Especially the presence of two such important spacefaring nations as France and India amongst the signatories makes it worthwhile to have a closer look into the question, whether the text of the Moon Agreement would lead to different conclusions regarding the international legal status of the moon.

9. The Moon Agreement and the Outer Space Treaty

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. Repeatedly, direct reference is made to the Outer Space Treaty as such.[33] The Moon Agreement clearly attempts to itself establish the conditions under which the free exploration or use of the moon, in conformity with the Outer Space Treaty, may be conducted.[34] 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.[35]

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.[36] This echoes the Outer Space Treaty's provision made in Article IX. In view of the circumscribed number of parties to the Moon Agreement, this provision as such is of limited application however. In other words, the confinement to other parties, of the duty to respect corresponding interests, takes on much more significance here. This, however, at the most 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 nine states parties, not to "mankind" as a whole.

10. The Moon: Exploration and Use

Consequently, it is of much greater significance that the Moon Agreement repeats the first part of Article I of the Outer Space Treaty.[37] 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".[38] 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.

Nevertheless, it can not be concluded therefrom that the moon, or its exploration and use, should be considered the common heritage of mankind by the states parties to the Moon Agreement. No specific instruments or mechanisms are defined by these provisions to ensure that all states, especially the developing ones, benefit from any material activities on the moon. Rather than an absolute obligation to achieve a particular result, it constitutes an obligation to 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.[39] 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).[40] Finally, no convincing reason has been put forward for using two different phrases when supposedly reference is to be had to the same principle.

All in all, it is therefore once more submitted that 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.

11. The Moon: Exploitation and Status

Upon closer scrutiny, however, next an essential difference arises between the Moon Agreement and the Outer Space Treaty. The latter, as established, deals with the whole area of outer space, alternatively by dealing 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.[41] 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 constituted *res* or *terra communis*.

The Moon Agreement, however, dealing with tangible *res*, read *terra*, such as the moon and the other celestial bodies, had to envisage a third category of activities: that of physical exploitation. Article 11 forms the core provision in this respect, since it provides that "the moon and its natural resources are the common heritage of mankind".[42] Thus, it creates 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. 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.

12. The Moon as Common Heritage of Mankind

The exploitation of the moon however is explicitly defined as the common heritage of mankind. The essence thereof 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.[43] 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".[44] 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 consideration".[45]

The application of the common heritage of mankind-principle to the exploitation of the moon is thus clear and unambiguous. 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 also reconfirmed.[46]

It should be concluded therefore, that even under the Moon Agreement the moon does not have a status as either comprehensively *res communis* or comprehensively common heritage of mankind. While exploration, use and scientific investigation fall under the former categorization, exploitation of natural resources falls under the latter one. To that extent, the Moon Agreement clearly differs from the provisions of the Outer Space Treaty relevant for the moon and other celestial bodies.

This, however, obviously applies only to those states party to the Moon Agreement, and, arguably, to those signatory to it. Even for them, no unequivocal definition of the moon as common heritage of mankind can be deduced; only for exploitation the application of the principle would be beyond doubt.

13. The Moon and Private Enterprise: National (Space) Legislations

The present international rules concerning space activities are primarily directed to states, and subsidiarily to public international organizations. This normative system is also applicable to private commercial activities, of course. However, at least presently private enterprise is not directly bound by those rights and obligations.[47] International space law in this regard does itself determine *how* private entities, through national legislation, should be bound to the substance of international space law.

States, after all, are held internationally responsible and liable for space activities, even if these space activities are partly or wholly privately conducted.[48] One should leave aside here the discussion on *which* categories of private space activities will incur the responsibility (and liability) of *which* particular state, as the "appropriate State" whose "national activities" they constitute. In the abstract, it is obvious that states will likely provide for national (space) legislations with a view to regulating those activities they might be held responsible (and liable) for.

14. The Moon and Three Types of Jurisdiction

From the point of view of private enterprise, for example on the issue of intellectual property rights, furthermore, it is to be noted that generally speaking states have three options for the purpose of legislation.[49] First, there is the option of territorial jurisdiction, which is the type exercised most commonly and comprehensively for such purposes.[50] Territorial sovereignty, however, is not applicable to outer space.[51] If based on the territoriality-principle, legislation of a state can only apply to persons or occurrences on its territory. It does therefore present a rather

flawed tool for the purpose of, for example, protecting intellectual property rights on the moon.

Secondly, there is what I label 'national jurisdiction': jurisdiction of a state over persons of its nationality undertaking certain activities.[52] In view of the fact that especially intellectual property rights legislation is usually based on territorial jurisdiction rather than on national jurisdiction, as well as from a practical point of view, this type of jurisdiction is (also) of little help in this regard.

That means, that the third type of jurisdiction becomes especially important. This concerns the quasi-territorial jurisdiction over space objects, by registration thereof and thus the grant of a quasi-nationality to it, as provided for by Article VIII of the Outer Space Treaty.[53] It provides the most efficient means to extend the reach of juridical authority into space for the purpose of regulating important aspects of private activities, such as especially those of intellectual property. For that reason, for example the United States amended its patent rights legislation, in principle applicable to American territory, to inventions made on board of space objects with United States registration.[54]

It should however be noted, that such extension of jurisdiction by definition can only apply to space objects, and possibly to activities directly linked to particular space objects. Once for instance more permanent habitats on the moon will become feasible, the inherent limitations of this third type of jurisdiction will immediately become clear.

15. The Dark Side of the Moon

Summing up, the moon might present an interesting prospective opportunity for private commercial activities as long as, *inter alia*, the applicable legal system is structured in a suitable manner for private enterprise to pursue its aims. Private enterprise is most obliged in this respect (within the parameters provided by law as far as justified from the perspective of the general public at large) by a uniform, transparent and logical legal system as regards its activities.

From this perspective, the moon actually and substantially has a dark side when it comes to undertaking activities there. Firstly, at the international level nothing akin to an international regime can be detected. More importantly, even an accepted basis for such a regime is absent: the status of the moon as *terra communis* is challenged by both those adhering to application of the common heritage of mankind-principle to the moon under the Moon Agreement, and those desiring to read more into the province of all mankind-principle than such a *terra communis*-status. On the other hand, any applicability of the common heritage of mankind-principle to the moon is both denied by a large majority of states and legal experts, and not even unequivocally established by the Moon Agreement itself.

The most relevant provision in space law from the perspective of private enterprise is the one resulting in non-application of territorial sovereignty to outer space. It leads to the second major problem: in the absence of any international regime providing for uniform rules, national regimes should do the job of duly protecting private enterprise's justified interests in space. However, they are fundamentally handicapped when trying to substitute an international regime. National space legislations as such, of course, already carry within them the risk of complications, confusions and absence of uniformity. But this is strongly aggravated by the fact that national law can apply in any comprehensive sense to outer space objects only. However, registration, which is required to achieve this result, depends on a conscious act and does not exist *ipso facto*.

As a consequence of the last aspect therefore, finally, the actual situation is even worse. Only a few states have actually and consciously taken action to provide for extension of scope of any national laws to space objects. The problems arising with respect to the European module of the international space station are a

case in point.[55]
Private enterprise, in conclusion, will confront a large measure of confusion as regards the legal parameters for any prospective commercial operations on the moon. While some entrepreneurs might come to the conclusion that, as a result, the moon presents interesting opportunities as a *de facto* free-for-all, both from the perspective of private enterprise and from that of the interest of the public at large - for instance in the safety of space activities - this bodes ill for the future.

References:

1. Session 1, "The Legal Status of Property Rights on the Moon and Other Celestial Bodies", Thirty-Ninth Colloquium on the Law of Outer Space, International Institute of Space Law (IISL), Beijing, 8 October 1996; see e.g. Second Announcement 47th International Astronautical Congress, 29, 34.

2. The German, Mr. Martin Jürgens, claimed that Frederick II the Great, King of Prussia, had bequeathed one of his ancestors with ownership of the moon in return for services rendered back in 1756, and that he had inherited such ownership. The Californian, Mr. Dennis Hope, had registered his claim to ownership of the moon locally at some point in the early eighties, and since then had begun selling plots (at a cost of some US$ 16 per square meter). Amongst his clients is rumoured to be famous US actor Burt Reynolds. See e.g. P.M. Krämer, *Wem gehört nun den Mond? [Who does the Moon belong to after all?]*, Kölner Universitäts-Journal 3/4-1996, 40-1; G. Gál, *Acquisition of Property in the Legal Regime of Celestial Bodies*, paper presented to the Thirty-Ninth Colloquium on the Law of Outer Space, Beijing, October 1996.

3. Mr. Adam Ismail, Mr. Mustafa Khalil and Mr. Abdullah al-Umari are said to have claimed inheritance of the red planet from their ancestors 3,000 years ago, as well as to be able to prove this by means of legal documents; as per news flash filed by The Associated Press.

4. 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), adopted 19 December 1966, opened for signature 27 January 1967, entered into force 10 October 1967; 18 UST 2410; TIAS 6347; 610 UNTS 205.

5. E.g. UNGA Resolution 1148(XII) of 14 November 1957, UNGA Resolution 1348(XIII) of 13 December 1958, but especially UNGA Resolution 1721(XVI) of 20 December 1961 and the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, UNGA Resolution 1962(XVIII) of 13 December 1963; texts e.g. in N.M. Matte, Aerospace Law (1969), Annexes I, II, IV and VII resp.

6. See e.g. M. Lachs, The Law of Outer Space (1972), 12-4.

7. See e.g. I. Brownlie, Principles of Public International Law (3rd ed.)(1979), 117, 134-5, 141 ff.

8. See extensively e.g. Lachs, 42-8; S. Gorove, Developments in Space Law (1991), 25-6.

9. See for *res nullius* e.g. Brownlie, 109, 180-1.

10. See on *terra communis* and *res communis* e.g. Brownlie, 181, 266-70; N. Singh, *Introduction to International Law of the Sea and International Space Law*, in International Law: Achievements and Prospects (Ed. M. Bedjaoui)(1991), 825 ff.; V.F. Wodié, *The High Seas*, in International Law: Achievements and Prospects (Ed. M. Bedjaoui)(1991), 887 ff.; also Art. 2, Convention on the High Seas, Geneva, signed 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 (hereafter LOS Convention), Montego Bay, signed 30 April 1982, opened for signature 10 December 1982, entered into force 16 November 1994; 21 ILM 1261 (1982).

11. See Art. I, Outer Space Treaty.

12. 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 Space Law - Development and Scope (Ed. N. Jasentulyana)(1992), 46-7.

13. See Art. III, Outer Space Treaty.

14. 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.

15. Artt. VI resp. VII, Outer Space Treaty.

16. Cf. e.g. A.A. Cocca, *Property Rights on the Moon and Celestial Bodies*, paper presented to the Thirty-Ninth Colloquium on the Law of Outer Space, Beijing, October 1996.

17. See also Artt. 136, 137, LOS Convention.

18. Cf. e.g. Art. 87(1), LOS Convention, providing the general rule of freedom, and e.g. Artt. 87(2), 88, 89, as providing exceptions thereto.

19. Cf. esp. Art. 137(2), LOS Convention.

20. Preamble, Outer Space Treaty.

21. Art. I, Outer Space Treaty.

22. Art. I, Outer Space Treaty.

23. Cf. e.g. Christol, 252, ff.

24. See Artt. 150 ff., LOS Convention.

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

26. 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.

27. See Art. IV, Outer Space Treaty.

28. Art. XII, Outer Space Treaty.

29. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (hereafter Moon Agreement), adopted 5 December 1979, opened for signature 18 December 1979, entered into force 11 July 1984; 18 ILM 1434 (1979); 1363 UNTS 3.

30. Australia, Austria, Chile, Mexico, Morocco, The Netherlands, Pakistan, The Philippines and Uruguay are parties; France, Guatemala, India, Peru and Rumania signatories to the Moon Agreement. See United Nations Treaties and Principles on Outer Space (1996), A/AC.105/572/Rev.1; 60-70, status as of March 1996.

31. See Art. 19(3), Moon Agreement.

32. Cf. e.g. Art. 18, Vienna Convention on the Law of Treaties, signed 23 May 1969, entered into force 27 January 1980; 8 ILM 679 (1969).

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

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

35. See Art. 11(2), Moon Agreement.

36. Art. 2, Moon Agreement.

37. See Art. 4(1), Moon Agreement.

38. Art. 4(1), Moon Agreement.

39. 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".

40. See Art. 6, Moon Agreement.

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

42. Art. 11(1), Moon Agreement.

43. Art. 11(3), Moon Agreement.

44. Art. 11(5), Moon Agreement. See also Art. 18. This obviously echoes the relevant provisions of the LOS Convention.

45. Art. 11(7(d)), Moon Agreement. Again, this echoes clauses of the LOS Convention.

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

47. See e.g. P.L. Meredith & G.S. Robinson, Space Law: A Case Study for the Practitioner (1992), 58, 67.

48. See Artt. VI, VII, Outer Space Treaty. See further e.g. Wassenbergh, Principles of Outer Space Law in Hindsight (1991), 23; B. Cheng, *The Commercial Development of Space: the Need for New Treaties*, 19 Journal of Space Law (1991), 36-40; H. Qizhi, *Certain Legal Aspects of Commercialization of Space Activities*, 15 Annals of Air and Space Law (1990), 337; H.L. van Traa-Engelman, Commercial Utilization of Outer Space (1993), 281-2; Meredith & Robinson, 67.

49. See e.g. Cheng, 37.

50. See e.g. F.A. Mann, *The Doctrine of International Jurisdiction Revisited After 20 Years*, in Further Studies in International Law (1990), 4-10; D.W. Bowett, *Jurisdiction: Changing Patterns of Authority over Activities and Resources*, 53 British Yearbook of International Law (1982), 4-10.

51. See Art. II, Outer Space Treaty. See further *supra*, discussion at para. 3.

52. Cf. e.g. Cheng, 37 ff.; Gorove, Developments, 20; Bowett, 4-10.

53. Of course, the word 'nationality' appears nowhere in Art. VIII or in any other legal text of the *corpus juris spatialis internationalis* in relation to registration. However, by analogy to the law of the sea and of the air, and in view of the resulting jurisdiction, for all practical purposes the registration of space objects should be deemed to result in a nationality thereof; cf. respectively Art. 5(1), Convention on the High Seas, and Art. 91(1), LOS Convention; and Art. 17, Convention on International Civil Aviation, Chicago, signed 7 December 1944, entered into force 4 April 1947; 15 UNTS 296; TIAS 1591. See further Christol, 213-4; R. Oosterlinck, *Private Law Concepts in Space Law*, in Legal Aspects of Space Commercialization (Ed. K. Tatsuzawa)(1991), esp. 52, i.a. quoting G.P. Sloup; also on ships and aircraft Brownlie, 242-3, 254-5, 319-20, 424-7.

54. See U.S. Patents in Space Act, Public Law 101-580, of 16 November 1990, 35 U.S.C. 105. Further e.g. G. Catalano-Sgrosso, *Copyright and Intellectual Property in Outer Space - Legal Protection of Discoveries and Inventions Made in Conditions of Microgravity*, in Proceedings of the Thirty-Seventh Colloquium on the Law of Outer Space (1995), 139.

55. See discussion e.g. at A. Farand, *The Astronaut in the Space Station Era*, in Outlook on Space Law over the Next 30 Years (Eds. G. Lafferranderie & D. Crowther)(1997), 153-4, 158-9; Catalano Sgrosso, 138-9.