



The concept of outer space property rights under international air and space law

King James Nkum¹, Beida Onivehu Julius²

¹ Legal Adviser and Research Consultant at Triune Biblical University, USA/Kingsland Foundation, Nigeria

² Law Lecturer and Researcher at Bingham University, Nigeria

Abstract

Outer space is that demarcation where the atmosphere of the earth terminates - the final frontier of the universe. Intellectual or private property ownership right and patents exists in outer space just as obtained in normal life. Outer space activities have gone beyond tourism and medicine to property ownership. Territorial sovereignty of states in outer space is an issue of concern requiring scrutiny. This is owing to the fact that clear delineation and demarcation of boundaries have given rise to competitive tendencies among human beings. The logical conclusion has been that the aerial sovereignty of a state ends with the atmosphere from where the space area begins. The national intellectual property regimes for instance, are generally based on territoriality although the application of national law to situation in space could pose some challenges. This article seeks to examine the emerging legal right of property ownership in outer space and related developments or concerns.

Keywords: concept, property, international, demarcation, atmosphere, medicine

Introduction

The historic launch of Sputnik by the then USSR on October 4, 1957 laid the cornerstone of space race in the history of mankind. Launching of the first sputnik by the USSR accelerated the affinity with the outer space of earthly people. Originally started for reconnaissance during the Cold War period, space activities have now percolated to just about every other welfare activity. Civilisation has come a long way as man no longer want to capture the entire earth, but the colonization of outer space, making it human habitation outside the earth.

The character of space activities has fundamentally changed from public purposes to commercial ones in the last two decades. Commercial activities such as space tourism and habitation, space medicine, extraterrestrial mining, private property right in outer space among others are now the issues at the front burner in space ^[1]. Thus, it is needless to emphasize that the international environment for space activity has undergone tremendous change in recent times. The processes of commercialization and privatization have followed and altered the very course of such activities.

The 21st Century is a technological era with several technologies dominating the global economy, such as information and communication technology (ICT) ^[2], bio-technology, nano-technology and others – all facilitated by space technology. Man has been able to conquer his environment, including space. However, a major issue connected to demarcation or sovereignty in space is the question of the difference between aircraft and space craft (as well as the distinction between airport and spaceport). The behavior and the objective of a spacecraft would not be very different from that of an aircraft. There is therefore a need to harmonize the definition of an aircraft and a spacecraft. It may be stated at this stage that already 10 countries have

acquired unmanned space launch capability, while 50 countries have Satellites in orbit and 19 countries have suborbital capability. The existing Space treaties provide General Principles and unlike Chicago Convention of 1944, they do not have implementation rules/articles. As more and more commercial spacecrafts start operating there will be a need to regulate the traffic for aircrafts and spacecrafts simultaneously. This will bring in the issue of common safety requirements. In fact, it has been estimated that by 2020 the commercial space tourism industry could be worth in billions of dollars ^[3].

Intellectual or private property right and patent forms part of the numerous legal issues arising from the application of space to man's normal life in modern times. The entry into space activities by a number of governmental and non-governmental actors presents a great opportunity to understand, discover and invent ^[4]. The national intellectual property regimes are generally based on territoriality, meaning that the application of national law to situation in space might cause problems.

There are a host of jurisprudential arguments which strongly favour the establishment of a private property rights regime on the moon. The advocates for the private property in space point out the Deep Sea Bed analogy to further their cause. Another very strong argument in favour of the private property rights regime is the environmental concern that of preserving the earth by looking at an alternative reserve of resources ^[5].

The property rights include intellectual property rights include industrial property rights like patents, trademarks, copyrights and database ownership. All these rights exclude others from enjoying it for a limited period of time. Hence, the need to x-ray the present space law regime *vis-a-vis* its implications on intellectual property protection of inventions made in the space

as well as liability of infringement thereof. Related to this are the issues of patentability criteria of inventions made in space and trade secret protection, among other things.

1.2. Patentability of Space Inventions

The general principle of intellectual property on patent is that the rights are strictly territorial in nature where it was granted^[6]. The patent rights are usually territorial in nature and it is valid only in the country where it was granted. Neither the national laws nor international conventions (multi-country protection) like Patent Co-operation Treaty (PCT) deal with infringements of inventions used in or made in the outer space. The PCT is an important international agreement concluded in 1970 and currently about 150 countries is parties to it. PCT facilitates international procedures by multi-country registration of patents by filing of an application in a single office without delay and cost effectively. Before the PCT system, an applicant has to approach individual patent offices for registration. However, this multi-country registration arrangement does not provide an international patent rather it is largely a treaty for rationalization and cooperation with regard to the filing, searching and examination of patent applications and the dissemination of the technical information contained therein. The patent laws of every country normally explain the basic patentability criteria envisaged in the agreement which is novelty, non-obviousness and industrial application. These criteria may have an adverse bearing on the inventions made in the space and protection of patented technologies in the space.

Accordingly, with huge investments made in to space missions for scientific research by countries individually and collectively the question arises as to the determination of patent rights. There is no disputing the enormity of investment of intellectual property value in respect of space and in normal parlance the ownership questions of inventions are primarily with the creator. This is applicable to inventions made in space^[7].

As regards joint ownership of space stations and the resultant inventions made in such space stations, it is difficult to determine the ownership rights and place of registration of patents. Consequently, two methods of determining patent rights as currently practiced the world over include^[8]:

- i) The first-to-file patent system and
- ii) The first-to-invent system

Time and place of invention are irrelevant in a *first-to-file patent system*. Most of the countries use first to file system for the determination of priority. In this system, when more than one application claiming the same invention is filed, the priority of a right to a patent is based on the earlier-filed application^[9]. Thus the first person to register a patent would foreclose the right of a subsequent applicant.

On the other end of the spectrum, the first-to-invent system differs from first to patent system and the place of invention is critical for first-to-invent system. Only US, Canada and Philippines follow first-to-invent system. The US follows the first-to-invent system under which it considers the inventor's date of invention as date of conception. The person who converted the application into practice first will be entitled to get the patent, not the first applicant. Actual and constructive reduction into practice should be distinguished^[10]. All other countries in the world

follow the first-to-file system where the first applicant gets the patent irrespective of the date of invention. It is not possible to determine always that at what time the invention is made. Laboratory notebooks and other records are usually used for proving the claims. The inventions made in the space, the territorial rules will apply for patenting of such inventions. There exists uncertainty as to how the inventor will prove that the experiment made and practiced in the space or whether it will exactly work in the earth as that of space^[11]. It is also questionable the patentability in the case some of the experiments made in space and it practiced in earth.

The next criteria for determining patentability are the non-obvious character of the invention which was not disclosed earlier. There is no way to determine the prior art disclosure of inventions made in the space. It means that on the date of application, the invention should not be disclosed. The inventions taking place in a spacecraft are shielded from public knowledge, such as experiments done in a laboratory. The patentability criteria will be protected until it has been disclosed to the public or commercialization of the technology. As Mukhija posits, the inadvertent broadcasting of news regarding space activities will invalidate the claim of patent protection^[12]. Hence, there is the need for careful handling of inventions made in the space. The other side of the coin is the disadvantageous prospect that these restrictions prevents the right of the agency to inform the world about their inventions in the space and the right of the public to know about important scientific developments until the patent is filed on the ground^[13].

However, the Paris Convention 1883 on intellectual property provides some succor in this regard. The Convention is the oldest one for the protection of industrial property not only on inventions it includes trademarks, service marks, industrial designs, utility models, appellation of origin etc. Under the Paris Convention, contracting parties granted right of priority in other states, if they are claiming the rights within 12 months from filing of the patent. The later applications will not be affected by the publication of the prior invention^[14].

There are lots of collaborative efforts at the moment to send most of the space vehicles by consortium of countries. The ownership of such patents produced by joint ventures of different countries makes the matter more complex since such partnerships are based on specific agreements and the ownership of patents is also based on the agreements between the parties. It is advisable to agree upon the extent of protection and commercial benefits before sending the spacecraft and inventions. The entitlement of legal rights should be clearly mentioned in the agreement prior to launching. The question of who is an inventor is a critical question in the determination of proprietary rights, particularly in a collaborative effort^[14].

There is no gainsaying the fact that the commercialization of space technologies requires strong patent protection for technologies developed in the space. As such, liability for an existing patent infringement at the space has to be addressed by setting international norms through existing intellectual property regimes such as the trade-related aspects of intellectual property. The PCT may provide a possible inexpensive and less cumbersome way of filing patents in all countries involved in space related activities. There is the need for an international patent regime to promote innovation and inventions in space. It

is necessary to provide legal certainty and incentive to invest in space related research and creation of more intellectual property on space and other technologies by experiments in space ^[15].

1.3. Space Trade Secrets

No company or a consortium involved in the production of new technologies would not ensure to protect their trade secrets. The classification of technologies and multiple protections should be the part of the intellectual protection policy of the company. The protection of confidential information is an important task in all cooperative projects. It is fundamental to the maintenance of a trade secret that it be kept confidential and not be disclosed to others except under circumstances and with agreements which recognize the holder's trade secret rights ^[16]. This is important given the context that in most of the countries the nomenclature of the patent law is similar, but there is no uniform law in countries to protect trade secrets and it substantially varies from countries to countries.

The absence of specific agreements will make it impossible to protect the confidential information of the organization. Another area where the conflict of interest is in intellectual property rights in space is infringement of any existing patents of third parties. To avert this ugly incidence, it is imperative to take licenses from the existing inventors on likely infringements in the space ^[17]. Moreover, it would be wise to have separate agreements for individual projects, as the case may be.

1.4. Copyright in Remote Sensing Data

The need to protect the copyright in remote sensing data is an important issue for consideration under international space law. The general principle is that copyright protection is available for literary and artistic works, particularly for expression of original works fixed in a tangible form – excluding ideas. The oldest international instrument which provides copyright protection in the member countries is the *Berne Convention for the Protection of Literary and Artistic Works, 1888*. The agreement which facilitated better protection of copyright all over the world protects literary, scientific and artistic domain and all sorts of writings, photographs and maps ^[18].

Copyright issues in the space realm began with the launch of the first satellite, Landsat 1 by the US in 1972. The use of remote sensing of the earth by satellite has grown tremendously since then. For instance, Earth Observation Satellite Company (EOSAT) ^[19] was licensed in 1984 to do the remote sensing under the *Land Remote Sensing Commercialization Act, 1984*. The raw data or primary data was purchased by the data enhancing Industry, which sold the processed data for profit ^[20].

With reference to space copyright, it is pertinent to observe that although the OST provides that states shall bear international responsibility for national activities in outer space, it is not clear if this responsibility covers liability for any copyright infringement by state parties or non-governmental entities in the space ^[21]. Added to this confusion is the UN international regulations on remote sensing entitled *Principles Relating to Remote Sensing of Earth from Outer Space* which provides that remote sensing activities shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic, social or scientific and technological development, and taking into particular consideration the needs of the

developing countries. Alluding to the implication of this, Ketan observed that -

If these principles had the force of a treaty, which they do not, intellectual property rights in enhanced data would not be possible. Basically this agreement recognizing each country's sovereignty over its own wealth and resources, and also it attempts to prevent an entity from using information about a sensed state to exploit the state's resources. The processed satellite information is copyrighted and it was argued that this will reduce the accessibility of such data to users like developing countries ^[22].

In any event, there is the need to protect the enhanced data produced commercially by the space industry from piracy. Accordingly, the *Berne Convention* protects the processed data and the space conventions and principles protect the interest of developing countries and purchases of processed data. With the strict implementation of remote sensing principles of the UN, the intellectual property protection of remote sensing data will be difficult under the existing regime ^[23]. Moreover, in line with relevant UN resolution ^[24], disputes as to intellectual property protection of data should be resolved within the ambit of international law applicable to space intellectual property.

It is important to conclude by stating that copyright protection for processed data is necessary for further investment and development of the remote sensing industry. Moreover, any agreement on patent protection in space should also address the issue of enforcement and liability. The liability of private carriers for commercial and other purposes should be clearly fixed. Private tourism and commercial missions are already in the way.

1.5. Necessity for Space Intellectual Property Protection

Although space law is derived from the principle of international law, the *corpus juris* lags behind the pace of development in the sector. As would be expected, the scientific programs undertaken in space mission raises many questions on international law and the creation of new technological innovations and proprietary rights raises many questions on intellectual property protection at space. This assumes even more importance with the entry of private entrepreneurs in space exploration for scientific purposes. The conventional attributes of property rights give the power to exclude others from enjoying it. On the other hand, space law mostly propagates that space is a common province of mankind. These two approaches may often collide. The Moon Treaty goes further by declaring that the moon to be the common heritage of mankind. The concept of common heritage of mankind and proprietary rights would not go hand in hand. Private commercial investors argues that the absence of property rights prevent them from getting external financing and getting appropriate income from their investments. Thus the argument was that lack of sovereignty in space jeopardizes their ability to make profits from investments ^[25].

The character of space activities has fundamentally changed from public purposes to commercial ones in the last few decades. In light of the fact that space activities have a significant impact upon the welfare of humanity and society, it is necessary that there exists clarity in usage of outer space to be able to have the

most beneficial impacts on the society^[26]. This calls for the need to assess the legal regime for the protection of technology use and new inventions in an outer space. The fact that inventions in relevance to outer space activities, or space-related inventions can be made and can be used, either on earth or in an outer space resonates with the fact that the property laws are developed in strong associations with territorial and sovereignty of state, whereas an outer space is outside any of such state's territory. In this connection, it is pertinent to take into consideration the fact that the current *corpus juris spatialis* is vague and riddled with inconsistencies as regards the issue of establishing a concrete regime of property rights on moon and other celestial bodies or parts thereof^[27]. A thorough analysis and interpretation of the governing regime in the contentious arena reveals huge lacuna needing to be filled. Concerning the Moon Treaty, it introduces the much lauded and maligned concept of the *common heritage of mankind* to the considerations of space property law^[28]. As such, it is submitted that the common heritage principle must be defined in light of the Third Law of the Sea (LOS) Convention. Economic arguments towards a regime of private property rights in outer space, evidently reflecting the essential basis of all human behaviour, which has been historically (though non-euphemistically) called the *Tragedy of the Commons* have been advocated^[29]. Additionally, the current international regulatory regime does contain some provisions applicable to private exploitation of lunar minerals^[30]. This brings to the fore the issue of moratoria, a legal restriction against mineral exploitation and a *de facto* restriction which results from the ambiguity of the current treaties.

The foregoing points to the imperative of fashioning out alternative models of efficient as well as equitable *property rights regime* in outer space, which would concurrently take into account the interests of both the developed and the developing world. Moreover, a more concrete and consistent legal framework needs to be established so as to promote commercialization that has changed the very approach towards space activities, including prospects of extraterrestrial mining, space tourism and habitation^[31]. The absence of an international governing law and standard on rights and liabilities of intellectual property protection for inventions made in space may require a *sui-generis* regime to deal with the situation or necessary amendments to the existing space law. The space research and huge investment by governments and private corporations requires specific regimes and protection of their intellectual property generated in the space. Hence, it is imperative that the space-faring nations should develop an international regime to foster space related science and technology research^[32].

There is the need for a more concrete and consistent legal framework that needs to be established so as to promote commercialization that has changed the very approach towards space activities, including prospects of extraterrestrial mining, space tourism and habitation. It is well-established that exploitation of the moon is extremely profitable and commercial enterprise values the moon for its mineral resources and their uses. The minerals found in abundance on the moon can be used in their natural form or refined into structural, thermal, and electrical materials. Moreover, while the private enterprise receives the possible financial benefit from the risky undertaking, people throughout the world should benefit since space resources

will conserve the earth's scarce natural resources, further scientific discovery, and boost the world economy^[33].

As such, the space aspiring nations should come up with international principles that effectively extend their national jurisdiction to the space activities limited to the intellectual property activities. Harmonization with municipal laws is mandatory for successful implementation of proprietary rights in space. On their part, developing countries should come out with their respective space regime as soon as possible to cope up with the pace of development in the space activities and technologies. As Ketan observes however, any law should take into account the following basic premises^[34]:

- i) Any law applicable to land may be inapplicable in space
- ii) The proposed law should cover all aspects of space activities
- iii) The overlapping of jurisdiction should be avoided
- iv) International law principles should be applicable to space activities, intellectual property protection in particular
- v) Intellectual property protection is necessary for further investment in space related scientific research.

In the final analysis, the arena of establishment of private property rights is one aspect of the plethora of issues that need to be settled, like those of weaponisation of outer space, environmental degradation and combating of the same in the global commons, space tourism, and allied ones. As is well-established, customary international law imposes on all states an obligation to ensure that activities within their control do not injure other states, which in the face of widespread and consistent state practice has changed primarily into one of prevention and control. However, the existing legal framework abysmally fails in establishing a concrete liability regime in dealing with issues arising in outer space, high seas, Antarctica, etc. and other areas which have been aptly be described as common heritage of mankind. In order to manage these problems, it is proposed that a global organization be set up to regulate and administer properties found beyond the earth's atmosphere^[35]. The organization will have the duty of holding all the lands found in outer space as representatives of the people of earth, since all persons of earth *own* everything in the outer space found within our solar system in undivided, un-transferrable shares^[36].

References

1. Legal Adviser and Research Consultant at Triune Biblical University, USA/Kingsland Foundation, Nigeria.
2. Law Lecturer and Researcher at Bingham University, Nigeria.
3. See Baca, Kurt Anderson. "Property Rights in Outer Space", 58 J. Air L. & Com. 1993, P.1041.
4. The information and communication revolution have restructured patterns of development all over the world, as science and technology have come to rescue human being in many areas. After the invention of new technologies, computer, internet and satellite played an important role in communicating information, knowledge and messages. From the development of wireless to the satellite communication world has become closer in the global context fulfilling the spirit of global village and India is not an exception.
5. Kaul, Sanat. Op Cit.

6. Raju, K.D. Op Cit.
7. Mukhija, Ketan. Op Cit.
8. Patents were granted for inventions as early as 1443, and the text of the oldest patent law in the world, officially announced as Inventor Bylaws was created in 1474 in the Venetian Republic. The patent law was enacted in England under the name of “Monopoly Act” in 1624. In US, patent protection provisions are explicitly provided in the Constitution itself. The underlying purpose of these legislations was the need to promote progress of useful technology and sciences, thus granting limited exclusive rights for a certain period of time to inventors. The patent law of 1790 was enacted in line with these provisions. It is clear that the mandates of the subsequent international agreements are to promote the protection of industrial property. See Ibid.
9. Mukhija, Ketan. Op Cit.
10. Ibid
11. Ibid
12. Ibid
13. Ibid
14. Ibid
15. Ibid
16. Ibid
17. Ibid
18. The current patent regimes in countries may be similar under the relevant agreement, although the output may not be uniform. It is highly recommended for a uniform jurisdiction under the auspices of the WTO be formed, which will work effectively than any other organization.
19. Mukhija, Ketan. Op Cit.
20. Ibid
21. Ibid
22. A private company.
23. Mukhija, Ketan. Op Cit.
24. Ibid
25. Ibid
26. Ibid
27. Principle XV of the UN document.
28. Mukhija, Ketan. Op Cit.
29. Ibid
30. Ibid
31. Ibid
32. Ibid
33. Richard, Berkley. “Space Law Versus Space Utilization: The Inhibition of Private Industry in Outer Space”. Wisconsin International Law Journal, Vol. 15, p. 425.
34. Mukhija, Ketan. Op Cit.
35. Ibid
36. Ibid
37. Ibid
38. Ibid
39. Ibid