CHALLENGES OF INTELLECTUAL PROPERTY RIGHT PROTECTION IN THE OUTER SPACE

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Abstract

As more private entities get involved in space activities, the issue of intellectual property would continue to dominate the conversation because the international laws on space activities appeared to ban property rights in outer space. Juxtaposing the exclusionary nature of protection for intellectual property rights on earth with the terrestrial nature of outer space activities is challenging, yet states and companies have to deal with the challenge. This study examined the challenges of protecting intellectual property rights in outer space in relation to private sectors' activities. The study employed the doctrinal method of research with emphasis on the international customary laws on outer space. The study found that international customary laws did not address protection of intellectual property rights in outer space, and that dispute settlement mechanisms for addressing the issues were not inadequate. The study concluded with an appraisal of Nigeria's activities in space and the need to improve on their visibility in the global space.

Keywords: Property rights, outer space, private entities, international customary law, dispute settlement.

Introduction

Intellectual property right is at the centre of private entities' space activities because investments in space would only thrive where there is an established legal framework. The Space environment has unique characteristics different from the terrestrial; its regulation also demands different approaches.

[1] The effectiveness of the legal regime depend on the level of protection afforded parties involved in space activities, whether individuals, private companies, research and academic groups or states.[2] The growth of the space sector is hinged on the legal structure that is accessible, stable and predictable.[3]

In 2011 when National Aeronautics and Space Administration (NASA) retired its space shuttle program,[4] the plan ultimately was for the private sector to provide transportation and other crucial services to and from the orbit to the earth.[5] Private companies such as SpaceX, Virgin Galactic[6] and Blue Origin[7] have been involved in research projects and delivery of critical services to the space sector.[8] As long as these private entities are

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[1] L.I. Tennen, 'Enterprises Rights and the Legal Regime for Exploration of Outer Space Resources' (2017) 47 U.PAC. L. REV. 281.

[2] Ibid

[3] Ibid

[4] M.B. Hershkowitz, 'Deep Space (Treaty) Exploration: Reviving Today's Obsolete Space Treaties' (2019) 28 Mich. St Int'l L. Rev 1.

[5] M. Wall, Let the Space Shuttle Rest in Peace, Experts Tell Congress, (SPACE.COM, 13 October 2011) <https://www.space.com/13274-space-shuttle-rip-retirement-congress.html> in Hershkowitz. Accessed 01/11/2023.

[6] Galactic, 'Spaceline for Earth' <https://www.virgingalactic.com>; William Harwood, 'Virgin Galactic Chalks Up 4th Commercial Suborbital Spaceflight with 3 Space Tourists Aboard' (CBS News,6 October 2023) https://www.cbsnews.com/news/virgin-galactic-launch-fourth-commercial-spaceflight/ accessed 01/11/2023.

[7] New Shepard, 'Blue Origin' <https://www.blueorigin.com/new-shepard>; W. Neff, C. Davenport and T. Trackin, 'How NASA Plan to Change the Way People Fly to the Moon' (The Washington Post, 31 October 2023) <https://www.washingtonpost.com/business/interactive/2023/nasa-moon-missions-landing-blue-origins-artemis/> accessed 01/11/2023

[8] M. Frackiewicz, 'The Role of SpaceX in National and Security Defence' (TS2,23 June 2023) <https://ts2.space/en/the-role-of-spacex-in-national-security-and-defence/> accessed 01/11/2023;

involved in space exploration, discussions on Intellectual Property (IP) would take central stage.

Most IP rights are based on the domestic laws of the state and protection does not extend to another state unless the IP is registered in the other states. The same allusion cannot be extended to outer space activities,[9] since whatever protection under national laws do not extend beyond boundaries of the state.[10] Space activities are regulated by international laws.[11] According to Merges, property right includes the power of possession, usage and disposal of any *res* or assets.[12] The characteristics of I.P are as stated below:

> It is 'good against the world' – no prior contract or other contract or other legal relationship is required to create a duty on the part of third parties to respect the right; it defines uses of an asset that are under control of the owner, it demarcates what is 'in' and 'out' of the owner's ambit of authority; it is broadly transferable; yet the owner retains residual rights over those aspects of right that are not transferred. In addition, it includes a special form of quasi-transfer power, in that it permits the owner alone to decide whether and when to enforce the right.[13]

Property rights must be respected because the holder has the liberty to enforce his right against the whole world, it is exclusive to him and protected by the domestic laws of states against anyone who violates that right.[14] The right-holder has the power of approaching the court in enforcing it because, according to Merges, "The property relation concentrates power over the assets in the hands of a single 'focal point'- the owner."[15]

I. P. protections are territorial and limited to the state offering the protection, it means that if the right is breached in another state, no right will accrue to the right holder unless

[9] Yhun Zhao, 'Protection of Intellectual Property Rights in Outer Space' (2006) American Institute of Aeronautics and Astronautics.
[10] Ibid
[11] T. Leepuengtham, *The Protection of IP Rights in Outer Space Activities* (2017) Edward Elgar Publishers, 149.
[12] R. P. Merges, What Kind of Rights Are Intellectual Property Rights in R. C. Dreyfuss and J. Pila (eds) The Oxford Handbook of Intellectual Property Law (2017) https://ssrn.com.abstract=2959073 accessed 01/11/2023.
[13] Ibid
[14] Ibid
[15] Ibid

the IP had been registered also in the state where the breach occurred.[16] Any protection offered by the state for IP right(s) is limited by years[17] and can only be enforced within the state. This Article discussed the challenges of using territorial laws in addressing IP rights originating from outer space.

1.1 The Extraterritorial Feature of Outer Space

The outer space environment is operated by different set of rules. Firstly, no state can claim exclusive sovereignty of the outer space in any form whatsoever;[18] to claim sovereignty in the outer space is to go against established international laws. All space activities including the activities of the commercial sector, private companies and intergovernmental agencies are to be carried out under the supervision and authorisation of the state; with particular emphasis being placed on the activities of non-governmental entities[19] in ensuring compliance with international laws.

The duty placed on states by the space treaties demands control which covers jurisdiction of the states, that can only work by registering the space objects.[20] The Registration Convention provides for the launching state, to be the state launching or procuring the launch of a space object. Such a state is responsible for the object(s) launched into space implying that the state can apply their IP rules to their space activities.[21] Where more than one state is involved in the launch of space objects, the state parties in their agreements will decide on which of the states is to exercise jurisdiction, thus:

> As such, while the non-appropriation principle applies, the space law regime provides relevant connections between the State of registry and the space object, and the space activities carried out in the space object. This would be one important and useful arrangement for the current discussion, especially in considering possible reconciliation of the space law regime with the intellectual property law regime.[22]

[16] Yun Zhao, 'Law Related to Intellectual Property and Transfer of Technology' in R.S. Jakhu and P.S. Dempsey (eds) Routledge Handbook of Space Law (Taylor and Francis Group, 2017) 321.
[17] Ibid.
[18] Ibid, at 322.
[19] Ibid
[20] See Article VIII of the Outer Space Treaty.
[21] Zhao, at 322.
[22] Zhao, supra n 16, at 322

The Registration Convention covers situation where intergovernmental organisations can register their space objects under another condition.[23] Where this occurs, the issue of IP had to be detailed and agreed on by the parties.[24] Zhao suggested that in the absence of a prior agreements between the parties, ideas can be borrowed from the arrangements concerning intellectual property's legal regime on the International Space Station.[25] In instances of lack of details on IP rights in outer space, reference can be made to other international regimes where there are similar bans on state's sovereignty.[26] Allusions can also be made to what operates on the high seas, because the two zones have similar characteristics.[27] Both zones are to be non-appropriated,[28] yet there are lots of mining opportunities in the zones, with additional prospects and challenges.[29]

Fearing that the developed states would edge out the less developed states from the benefits of the Deep Seabed, developing states advocated for making the Deep Seabed a Common Heritage of Mankind (CHM). Their arguments made the principle of CHM to become an international standard; included and adapted into the space treaties. The 1982 United Nations Convention on the Law of the Sea (UNCLOS) adopted most of the CHM principles and enjoyed less reception from the industrialised states who considered the principles restrictive especially as it lacks supports for mining opportunities.[30] Delicate balance had to be worked out between the CHM and protection of commercial activities.

2.1 The Challenges of International Laws in Regulating Outer Space

Carl Schmitt believed that the history of international law is linked to land grabbing that was rampant in the old-world order, and that international laws after the second world

[23] Articles V-VIII of the Registration Convention; Natercia Rodrigues, 'Registration of Space Objects: Requirements and Procedures' (2023) KiboCUBE Regulatory Webinar, https://www.unoosa.org/documents/pdf/Access2Space4all/KiboCUBE/RegulatoryWebinar/Kibo_Regulatory_Webinar_Registration_of Space_objects_Rodrigues.pdf. Accessed 15/02/2024.
[24] Zhao, at 323.
[25] Ibid
[26] Ibid
[27] Faculty of Law, University of Oslo, 'The Need for a Common Heritage of Mankind Based Regime for the Exploitation of Outer Space Resources: The Deep Seabed as Inspiration for Outer Space' (2020)
[28] See Articles 136 and 137 of UNCLOS adopted on the 10th of December 1982 which entered into force on 16 November 1994.
[29] University of Oslo, supra n 27.
[30] Ibid, at 13.

war reflected this.[31] The 1970 Declaration on Principles of International Law and Article 2 (1) of the United Nation Charter established a new international order was established by giving territories sovereignty. In the space sector, challenges likely to be posed by modern technology was addressed by the inclusion of Article II of the OST.[32] It was argued that inhibition against appropriation should not be equated with property rights in outer space, and that the ban against states' sovereignty must not be extended to rights in natural resources.[33] Gorove opined that the space treaties did not treat outer space differently from its resources, the two will have to be taken as the same; it will be contrary for any user to appropriate the natural resources of the outer space.[34]

In making analogy to the law of the sea, some scholars noted that states and private actors can make use of the resources of the outer space as long as the use is not permanent in a way as to impede others from right of use.[35] Blount and Robinson, in countering the arguments held that Article II of the OST has significance for territory and not property, because right to appropriate emanates from the right to the territory.[36]

Under international law, an area outside the jurisdiction of any state is known as global commons, a place or location not subject to the control and sovereignty of any state.[37] On the lingering question of the legality of space resources, comparison was made to the right to fish on the High Sea governed by the international law of the seas, it shows that 'extraction' is possible on an area designated as global commons.[38] Examples from international laws depict the fact that commercialisation of natural resources may be

[31] C. Schmitt, The Nomos of the Earth in the International Law of the Jus Publicum Europaeum 45 (2003) G.L. Ulmen Trans, Telos Press ed.
[32] P. J. Blount and C. J. Robison, 'One Small Step: The Impact of the U. S. Commercial Space Launch Competitiveness Act of 2015 on the Exploration of Resources in Outer Space' (2016) NCJLT 160 at 169.
[33] Ibid, see S. Gorove, *Studies in Space Law: Its Challenges and Prospects* (1977) (Sijthoff A. Leiden ed.) 82 cited in Blount and Robison
[34] S. Gorove, 'Limitations on the Principles of Freedom of Exploration and Use in Outer Space' (1970) 13th Colloquium on the Law of Outer Space 40 cited by Blount and Robison.
[35]Blount and Robison, 170 citing F. Tronchetti, The Exploitation of Natural Resources of the Moon and Other Celestial Bodies—A Proposal for a Legal Regime (2009) 32.
[36] Ibid.
[37] Blount and Robison, supra n 32 at 171.
[38] Ibid; see the International Law of the Seas (UNCLOS) and the Antarctic Treaty.

allowed under certain circumstances as seen in the Antarctic Treaty and the UNCLOS.[39] Therefore, the same position can be taken under the international space law, to this end, Blount and Robison pointed out the following:

> Resource extraction for commercial purposes therefore can be interpreted as a valid 'use' under general international law governing global commons, and the lack of a specific clause prohibiting such extraction within the body of space law is indicative of it being a valid use within the lex specialis of outer space. To that end, article II leaves significant gaps that cannot be filled by comparison to other global commons which specify the extent to which States can exploit resources.[40]

2.1.1 International Customary Law Relating to Outer Space

The most challenging issue before the international community is balancing conflicting interests of states on one hand, and commercial interests of non-state actors involved in space activities on the other hand. In the bid to protect their own economic interests, commentators would always choose narratives that align with their interests, "thus, the stakes of an international agreement on the appropriate interpretation of the Outer Space Treaty are particularly high".[41]

International customary law is important in balancing the conflicting interests in outer space, and "to determine the existence of a rule of customary international law and its content, it is necessary to ascertain whether there is a general practice accepted as law".[42] International customary law entails two important elements comprising *state practice* and *general acceptance* also known as opinion juris.[43] These elements have been touted as evidence of proving customary international law, Pershing alluded to the decision of the International Court of Justice in the case of Nicaragua v United States where the court held as follows:

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[39] H. Nielsen, Selling the South: Marketing and Commercialisation of Antarctica (2017) University of Tasmania, https://hdl.handle.net/102.100.100/533884

[40] Blount and Robison at 172-173.

[41] A.D. Pershing, 'Interpreting the Outer Space Treaty's Non-Appropriation Principle: Customary International Law from 1967 to Today' (2019) Yale Journal of International Law Vol. 44, Iss.1

[42] Ibid

[43] H. Jamil and S. Koonan, 'The State, State Practice and International Law: A Critical Examination (202303 TWAIL Review 204-222.

> The conduct of the States should, in general, be consistent with such rule, and that instances of States conduct inconsistent with a given rule should generally have been treated as breaches of that rule, not as indications of the recognition of a new rule.[44]

Evidence of long state practice gives credence to customary international law, it shows consistency on the part of the law, but evidence of long practice may not apply to space law due to recent nature of the developments of the law. Pershing argued that irrespective of the absence of evidence of long practice, customary international law can still be established, even within a short period of time.[45] State's actions have effect on international space law, and

> Instead of relying on the length of time that States have treated a particular rule as a customary international law, other potential sources of evidence that can support a claim of a customary international law includes treaties, decisions of national courts and international tribunals, national legislation, diplomatic correspondence, opinions of national legal advisors, and the practice of international organizations.[46]

The goal is to beat the requirement of long practice for validation on customary international law with other means of proof. It must be borne in mind that the space treaties were drafted at the time that private entities' involvement were not envisaged or planned for and technological advancement were limited, therefore, condemning the treaties in their entirety would be unjustified. States parties were the main characters envisaged and prepared for in space treaties at the time, yet no state was allowed the right of appropriating any part of the outer space in any form.

2.1.2 National Laws forming Customary Laws in Outer Space.

State's interpretation of international treaties is very important, it gives credibility, acceptance and weight to such international laws. The more a treaty is accepted and embraced by states, the more weight it would garner internationally. It has a way of establishing the narratives around the treaties, a good example of this is the Moon

[44] Ibid, Nicaragua v United States (1986) I.C.J 14, 98
[45] Ibid, N. Sea Cont. Shelf Cases, 1969 I.C.J. 3, 43
[46] Ibid at 154; see UNOOSA, 'Customary International Law' at https://www.unnosa.org/documents/pdf/copous/lsc/2019/tech-07E.pdf. Accessed 22/10/22230

Agreement that had received little or no support from major space faring states with few states signing or ratifying the Agreement[47].

States' practice of interpreting the provisions of the space treaties is gradually changing international customary laws of space. States at the forefront of these narratives are mostly the space faring states, and they tend to adopt the narrow interpretation[48] in order to pave way for their plans to explore and exploit the outer space especially in the interests of protecting the private sector. In other words, "domestic law, both in the United States and abroad, provides further evidence of the shift in customary international law…" [49]

The US started the trend towards a change in international customary law when it came back with lunar stones in1969 after sending the first man to the Moon, some of the lunar resources that it came back with were later appropriated.[50] Their action set off a change that has become accepted over the years as many states became space faring and got access to the outer space. The United States had expressly asserted their ownership over many of its resources it had picked from the lunar, by declaring that "Lunar material retrieved form the Moon during the Apollo Program is U.S. government property."[51]

Though the US is not a party to the Moon Agreement, its attitude towards the treaty shows its opposition to language of the treaty as they do not align with their national interests in exploiting the outer space. In addition, the language of the U.S. domestic laws on outer space denotes a complete shift in customary international law. The U.S. achieved this by hiding up under the guise of encouraging private commercial activities in outer space, and the opportunity came in 2004 when the initial commercial use of space was mentioned in a domestic legislation.[52] Probably, the most daring domestic

[47] Blount and Robison, supra n 32.
[48] A.D. Pershing, supra n 41.
[49] Ibid at 159.
[50] Mark Bosworth, 'What Happened to NASA's Missing Moon Rocks' (BBC News, 20 February 2012) <https://www.bbc.com/news/magazine-16909592>; Chris Lefkow, 'What Happened to the Apollo Goodwill Moon Rocks' (PHYS.ORG, 16 June 2019) <https://phys.org/news/2019-06-apollo-goodwill-moon.html> accessed 01/11/2023.
[51] Pershing, supra n 41, at 158.
[52] Commercial Space Launch Amendments Act of 2004.

legislation by a state is the Spurring Private Aerospace Competitiveness (SPACE) Act of 2015 by the United States of America.[53] The Act gave rights to US citizens engaged in commercial space activities to harvest asteroid resources, to possess and dispose them as long as it complies with international law. It is however not clear how exploiting asteroids by private actors would still be in line with international law.

It is interesting to note that other states have followed the path adopted by the United States. Luxembourg followed suit in 2017.[54] The United Arab Emirates is also planning on enacting similar national legislation.[55] Interpretation of many of the principles in the space treaties are changing now as never before, one of such is the non-appropriation principle which some legal jurists are now interpreting narrowly.[56] It is observed that the current interpretation differs greatly from the intention of the legal jurists that were involved in drafting the treaties.[57] Jurists now argue that 'use' of space resources is allowed by the space treaties,[58] although they stopped short of imposing total legality of the appropriation. Few legal jurists[59] are still opposed to this position even if the generality of international community seem nuanced in the face of what is now happening in the international space customary law.[60] Pershing stated as follows:

> Taken together, the elements described above—statements made in the international arena, de facto appropriation of space resources in the form

[53] U.S. Commercial Space Launch Competitiveness Act, H.R. 2262, 114th Cong. (2015)
[54] The Luxembourg law was known as "On the Exploration and Utilisation of Space Resource" in 2017. Article 1 is to the effect that "space resources can be appropriated" and Article 3 gave the legal backing to private actors to exploit space for commercial purposes.
[55] See Sarwat Nasir, UAE's National Space Law Comes into Effect' (UAE, 24 February 2020) <https://www.thenationalnews.com/uae/science/uae-s-national-space-law-comes-into-effect-1.983817>; Watson Farley and Williams, 'Key Features of the United Arab Emirates Regulations on Space Activities' (WFW, 10 August 2023) <https://www.wfw.com/articles/key-faetures-of-the-new-united-arab-emirates-regulations-on-space-activities/> accessed 01/11/2023
[56] Pershing, supra n 40 at 161,
[57] Ibid; B. C. Gruner, Comment, A New Hope for International Space Law: Incorporating Nineteenth Century First Possession Principles into the 1967 Space Treaty for the Colonisation of Outer Space in the Twenty-First Century (2004) 35 SETTON HALL. L. REV. 299, 304.
[58] Lukasz Olejnik, 'The Outer Space and Promoting Responsible Use of Outer Space' (Just Security, 7 July 2023) <https://www.justsecurity-org/86823/the-outer-space-treaty-and-promoting-responsible-use-of-space>; cf Vladmir Kopal, 'Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies' (2008) UN Audiovisual Library of International Law, https://legal.un.org/avl/pdf/ha/tos/tos_e.pdf accessed 01/11/2023
[59] Ibid
[60] Pershing at 162.

> of moon rocks, the adoption of new national policies permitting appropriation of extracted space resources, and the weight of the international legal community's opinion—indicate a fundamental shift in customary international law.[61]

The main objective of national regulations of outer space depicted by the actions of states like US and Luxembourg's examples is to pave way for private sector in outer space by driving a new economic order,[62] thus interpreting Articles I and II of the OST to suit purpose though the right interpretation should derive from the text of the treaty itself.[63] In essence, national laws make the lacunae in international space law obvious:

> For this reason, space mining entities urged States to adopt national laws that apparently provide them with the necessary and sufficient discipline to carry out space exploitation, but which nevertheless firmly establish that respect for and compliance with international law is guaranteed.[64]

3.1 Private Actors Changing the Game

There is no doubt that private actors have their gaze on profits to be made from exploiting the outer space.[65] The only challenge is the legal impediments created by the international laws on space, especially the non-appropriation principle, and it does not appear that international law will change any time soon considering the number of states that are now involved in space activities. The only option available to the private entities is to lobby their states to recognize these rights in their national and domestic laws. As Pershing observed, most states will bow to the pressure from the private sector as already shown by what is happening in US, Luxembourg and the UAE. The global community will have to act to stop the tide.[66] In essence,

> The prospect of high profits from the extraction of space resources will likely incentivize private companies and individuals to pressure States to

[61] Ibid.
[62] F. Ludovica, International Space Law, International Law Principles Governing the Exploitation of Outer Space Resources: Assessing A Provisional Legal Framework for Allowed Activities (2018/2019) LUISS; F. Tronchetti, 'The Non-Appropriation Principle Under Attack: Using Article II of the Outer Space Treaty in Its Defence' (2008)33 Annals of Air and Space Law 1.
[63] Ibid.
[64] Ibid
[65] Robert Wall et al, 'How to Profit in Space: A Visual Guide' (The Wall Street Journal, 25 June 2019) <https://www.wsj.com/graphics/new-space-race/> accessed 01/11/2023.
[66] Pershing, supra n 40 at 162.

> recognize and protect private in situ property rights…As increasing government openness to private commercial space activities suggests, States will likely buckle under this pressure and allow private companies or private entities under State control to exercise ownerships rights.[67]

The case of *Nemitz v United States*[68] raised questions on the right of individual to appropriate the resources of the outer space.[69] On one hand is the argument that the treaty covers private actors by virtue of the term "any other means" included in Article II of the OST.[70] It was further argued that state can grant to private actors property rights as "an act of territorial appropriation."[71]

For Blount and Robison, the contention is not whether states can grant rights to private actors as they believed that had been settled by Article IV of the OST; the main issue, as they argued is the extent of the right, especially as states are responsible for the activities of their non-governmental actors. While states retain jurisdiction over private actors, they also have rights within the framework of the space treaties. The rights encompass commercial rights as long as it is subject to states' authorization of the activities.

Space mining is an area of outer space activities that had captured the interests of both states and private actors in space, not the least because of the prospect of mining the numerous resources deposited on celestial bodies especially on the moon, and as Tronchetti noted;

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

[67] Ibid
[68] Nemitz v. United States, No. CV-N030599-HDM (RAM), 2004.
[69] P.J. Blount & C. J. Robison, 'One Small Step: The Impact of the U.S. Commercial Space Launch Competitiveness Act of 2015 on the Exploitation of Resources in Outer Space' (2016) 18 NC JL & Tech 160.
[70] C. O. Christol, Article 2 of the 1967 Principles Treaty Revisited in Outer Space: Problems of Law and Policy (1997) 78 in Blount and Robison.
[71] Blount and Robison, supra n 32 at 166.

> limonite or olivine can be removed as water vapor by warming up these minerals with hydrogen. The water vapor which is obtained can be condensed and electrolyzed into hydrogen, and oxygen is liquefied. These components can be used as life support or propellant for oxygen.[72]

Helium-3, the most valuable resources discovered on the moon is rarely found earth, and not in commercial quantity. The discovery of water at the south pole of the Moon,[73] indicated that life can be supported on the Moon, Tronchetti further observed that

> The most valuable resources contained in the Moon is Helium-3. Helium-3 may be considered the main reason behind the interest that States and private operators are showing with respect to the Moon and to the exploitation of its resources. Helium-3 is an isotope, scarcely present on Earth but abundant on the Moon, which combined with other materials, such as deuterium, can be used as fuel in fusion power reactors. The value of Helium-3 is that it can generate nuclear power and, as a consequence, energy in a clean way, namely through a process of nuclear fusion which does not produce toxic waste…the extraction of Helium-3 is likely to have a huge impact on the way energy is produced and distributed on Earth. Helium-3, indeed has the potential to replace fossil fuels and other substances as primary source of energy on Earth. It has been estimated that twenty-five tonnes of Helium-3 can provide all the power that the United States needs in a year.[74]

Private actors are involved in space activities including provision of services, exploitation and transportation as seen in what SpaceX had been involved with in the last few years. Other companies such as Boeing, Blue Origin, and Virgin Galactic are taking up more stakes in the space sector (both for commercial and private purposes). The prospects of making huge profits from prospecting the resources of the outer space outweighs this and dragged discussions about the national space regulations back to the centre stage.[75]

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[72] Fabio Troncetti, 'The Exploration of Natural Resources of the Moon and Other Celestial Bodies' (2009)
[73] Fabio Tronchetti, 'The Moon Agreement in the 21st Century: Addressing Its Potential Role in the Era of Commercial Exploitation of the Natural Resources of the Moon and Other Celestial Bodies' (2010) Journal of Space Law, Vol.36, 489.
[74] Ibid, at 494-495; M.B. Hershkowitz, 'Deep Space (Treaty) Exploration: Reviving Today's Obsolete Space Treaties' (2019)28 Mich St Int'L Rev 1, 20.
[75] N. M. Genzer, 'Four Ways to Make Money in Space' (MarketPlace, 14 March 2014) <https://www.marketplace.org/2014/03/14/four-ways-make-money-space/> accessed 01/11/2023.

3.2 The Commercial Space Launch Competitiveness Act (CSCLA)'s Impact on International Space Law

The United States SPACE Act states that

> A United States citizen engaged in commercial recovery of asteroid resource or a space resource under this chapter shall be entitled to any asteroid resource or space resource obtained, including to possess, own, transport, use and sell the asteroid resource obtained in accordance with applicable law, including the international obligations of the United States.[76]

The SPACE Act is quite specific in the bundle of rights it grants to any U.S. citizen, though it was crafted in a way that would seem to align with international space law. The wordings of the Act were carefully chosen to ensure property rights in mined resources of the outer space or other celestial bodies. The Act gave property rights to asteroids resources but stopped short of granting sovereignty as that will go against international law, and

> by narrowly defining the rights that entities have to such resources, American legislators have arguably avoided showing an intent to allow private entities to have exclusive control over a celestial body or a portion of a celestial body from which resources could be extracted.[77]

Though the language of the Act suggested compliance with international space law, it is believed that Article II, Title IV of the Act will in fact encourage breaches of international space law by private actors. Blount and Robison held that in the bid to make rightful claim to asteroid resources, a private entity could make a claim of wrongful interference against another party, preventing the third party from having access to the resources. Thus, expressly violating the provisions of Article II of the OST.[78]

National laws are important in providing context to international laws. The actions of states in interpreting and applying treaties give validation to treaties, and entails the growth of international law "as state act and react within legal lacunae".[79] International

[76] See the US SPACE Act, 2015.
[77] Blount and Robison, supra n 32 at 176.
[78] Ibid.
[79] Ibid, at 177.

incidences give validity to international law,[80] as it shows the application and interpretation of law to the incidents and establish the doctrines of international law. In essence, the way states use international law in resolving international disputes portrays the extent to which states appreciate the obligations they have under international law.[81]

Against the background above, international laws are mostly the outcome of several negotiations, and they metamorphosed from soft laws (non-binding agreements) to treaties. It is not *surprising* that states sometimes fail to comply with the provisions of space laws. National laws and regulations are harnessed by states to fill up lacunae in international law, already understood by what the U.S. and other states are undertaking. What these states are doing is declaring their own interpretation of international law in the wordings and language of their domestic laws.[82] A picture is painted below:

> As states work out the content of ambiguous terms in international law, State legislation plays an important role in revealing state interpretations of legal rights and obligations, especially when States enact legislation that is meant to comport with international law. In such scenarios, the legislation itself becomes an important epistemic unit in analysing the content of international law.[83]

In summary, to understand the U.S. space ideologies, understanding and interpretation of international space law, one has to look at the content of the U. S. SPACE Act. However, it has been noted that the SPACE Act itself does not violate international space law since Article II of the OST tolerates different interpretations having failed to provide interpretational guidance. In addition, given the clever drafting of the SPACE Act and the acknowledgment of international law in the body of the text, it can be argued that the U.S. interpretation is still within the allowed limits of the law.

In linking Title IV of the SPACE Act to Article II of the OST and asking whether it can be accepted as a valid interpretation of the OST, Blount and Robison note that it would

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[80] W. M. Reisman, 'International Incidents: Introduction to a New Genre in the Study of International Law' (1984) 10 YALE J. INT'L. L. 1. C
cited by Blount and Robison at 177.
[81] Ibid
[82] Blount and Robison, supra n 32 at 179.
[83] Ibid at 180.

depend on the actions of other states.[84] If other states reject this interpretation, it might make the U.S. to change their stance or to stick to their guns as "a persistent objector".[85] Another step that can be undertaken by states is to create an international threshold that actions of states in relation to outer space can be measured against but there is no such thing at present.

International reactions will either prove acceptance or rejection and will become important in preserving the sanctity of international space law. Without states' rejection of the U. S. stance, every other objection would only remain purely academic.[86] It would amount to one thing; that the US position remains valid because "if other states do not contest this extension, then it is reasonable to interpret Title IV as legislation that represents a step towards defining the content of Article II and the law concerning the specific activity of space mining".[87]

In the absence of the rejection of the U. S. position on Article II, the international space community will have to take decisions on important issues that will crop up. The activities of states in outer space will require a legal regime in order to address all the conflicting interests in the use of space whilst ensuring that global peace and security are not threatened by activities in outer space.[88] International law is an avenue for stability and peace in international relations, negotiations amongst states is conducted on equal basis whilst trying to find a balance between protecting individual interests and interests of the global community.[89] One area that the above has often played out is when advancements in technology threatens one of the structures of the global community, like sovereignty.[90]

The issue of appropriating extracted space resources remains a highly contested topic under international law. It is unclear at which point that a state would be said to be

[84] Blount and Robison, supra n 32 at 181; see also P. J. Blount, 'Jurisdiction in Outer Space: Challenges of Private Individuals in Space' (2007) 33 J. SPACE. L. 299.
[85] Ibid.
[86] Blount and Robison at 181.
[87] Ibid.
[88] Blount and Robison at 182.
[89] Ibid.
[90] ibid

extending its territorial jurisdiction to space resources. These are among issues that were not envisaged in the treaty's era, the complexities of technology are one reality of modern-day space activities because advancements in technology brings with it new contending areas for international law.[91]

Uncertainties around Article II of the OST came because states grappling with increasing advancements in technology cannot determine the limit of state power in outer space.[92] There are suggestions that stability and peace on outer space can be achieved via other means than the by solving the sovereignty problem. A legal regime that addressed all the pending unresolved issues surrounding outer space and its utility is urgently needed; states have to adopt a standard of use on which the actions of states will be measured.[93]

4.1 Disputes Settlement of Outer Space Activities

4.1.1 Jurisdictional Issues

With regard to international disputes, private international law is applicable but when disputes centres on activities in outer space, it is not clear whether private international law will be applicable. In a situation where an invention from outer space was registered in all the states of the astronauts involved, but such patent was infringed in states where it had not been registered, the question of which court will have jurisdiction remains unresolved.[94] This scenario would be covered by private international law, but where the location of the infringement is outer space, the choice of the court becomes indefinite.[95] The uncertainties around patents are likely "relating to the validity of a patent and infringement proceedings".

The import of the above is that more than one court may have jurisdiction, with several attendant consequences such as 'forum-shopping and irreconcilable judgements'.[96] Jurisdiction is usually determined by the place of residence of one of the parties or the

[91] ibid
[92] ibid
[93] See Article IV of the Outer Space Treaty.
[94] T. Leepuengtham, The Protection of IP Rights in Outer Space Activities (Edward Elgar Publishers 2017) 150.
[95] ibid
[96] Ibid

subject matter. The place of residence of an astronaut or researcher will confer jurisdiction on the courts in most states which would entail that the person has some kind of presence in the state. Domicile can be conferred due to physical presence[97] or business interests.[98] States like the U.S have 'minimum contacts' criteria that could be used to confer jurisdiction.[99] In other word, the courts in the U.S. could exerts jurisdiction without a defendant having a physical presence in the U.S.[100]

Despite[101] lack of personal jurisdiction, a court can still exercise jurisdiction where there is "an appropriate connecting factor between the cause of action and the forum to justify assertion of this special jurisdiction". The 'connection' is to be established between 'the subject matter of the dispute and the forum'. Article 24 (4) of the Brussels I Regulation (Regulation (EU) 1215/2012) gives court jurisdiction over disputes on IP rights that are registered, which means that the jurisdiction will not extend to copyright and any other rights that are not registered.[102] Article 24 (4) does not extend to registered IP rights but the other provisions of the Regulation do.

4.1.2 Resolving Issues of Private Rights in Space

Space entrepreneurs' rights are to be considered and protected in space.[103] Most of the protection come in the form of authorization and supervision by the States as enshrined in the space treaties. Private property rights claim in outer space is hinged on two elements: the right to possess and dispose the res and the right to keep others from encroaching on the *res*.[104] It is interesting to note that the right of exclusion does not exist in outer space, and cannot be achieved by claiming appropriation.

Protecting the rights of private actors must be without the power of appropriation being conferred on them. Due to the continued supervision and authorisation by the States, the

[97] Pennoyer v. Neff (1877) 95 U.S. 714
[98] Due Process Clause of the Fourteenth Amendment (US Constitution) 1865,
[99] International Shoes Co. v. Washington (1945) 326 U.S. 310
[100] Leepuengtham, supra n 94.
[101] Ibid, at 156.
[102] See Article 25 (4) of the Brussels I Regulation
[103] L.I. Tennen, 'Enterprise Rights and the Legal Regime for Exploitation of Outer Space Resources' (2017) 47 U. PAC. L. REV 281 <https://schorlarlycommons.pacific.edu/uoplawreview/vol47/iss2/14>.
[104] Ibid, at 292.

activities of the private actors are curtailed, it is unlikely that an entity will carry out activities that will jeopardise the chances of other states in outer space. Most importantly, the private actors are in fact protected as the chances of being disturbed in the use of space is also limited. In the improbable chance of interference from the state, private entities or others, issues would have to be resolved between the parties.

Dismissing the likelihood of interference, Tennen noted that it is highly improbable that an authorizing state would interfere or attack a private entity in space considering the difficulties and costs of that, especially when there are other means of addressing the issue(s) on earth.[105] A similar analogy can be made for private actors attacking a licensed entity as

> An application or request for authorization to conduct a mission with clear intent to cause physical interference with an existing facility on a celestial body would have little chance of obtaining regulatory approval. The state itself would object to such a purpose. The entity operating the authorized facility certainly would object.[106]

Embarking to outer space with the single goal of disturbing another entity of the use of space is not likely to enjoy public support; the public and other interested parties are definitely going to object to approval of such by the state government. In addition, an entity can object to application(s) made for authorization of mission from another entity where such authorization would lead to interference, in which case, the state will have to conduct their own findings and probably impose conditions that would safeguard interference[107]. In addition,

> Where interference occurs in situ, these kinds of modifications can be made to the license or other grant of authority, which would be an appropriate implementation of the state's obligation to provide continuing supervision of its non-governmental entities in space. As aggrieved party could seek to invoke administrative or judicial procedures, including, in appropriate cases, provisional remedies or injunctive relief as available under domestic law.[108]

[105] Ibid
[106] Ibid
[107] Ibid, at 293.
[108] Ibid

Where an order had been issued against an entity, enforcement at outer space entails serious challenges, but there are several channels of achieving enforcements like resorting to domestic regulations of the state. These

> can include revocation of the authority to conduct the commercial space operation, restrictions on communication links, cease and desist orders, injunctions, attachment of property, fines, currency and banking limitations, and in proper cases criminal charges.[109]

In relation to interference that pertain to intellectual property and other infringements, the same condition(s) as obtained on earth would be applicable in such situations. National as well as international laws will come into play, even for disputes that started at the outer space, it would have to be handled on earth.[110] Article IX of the OST prepare for situations where the proposed activity of an entity may likely interfere with that of a commercial company, consultations between the parties becomes necessary.

Consultations could also be initiated by the state active in outer space on becoming aware that the activities of another state or entity would interfere with their own activities.[111] In case of interference, the OST provide for liability, but other means of resolving disputes including international relations may be employed.[112] Though consultations can be effective, its effectiveness in resolving the disputes between the parties is not promised, it works just to ensure that states do not resort to self-help and barbarism in outer space:

> thus, the domestic authorization procedure and the international consultations framework provide significant protection for the right of authorized entities to occupy and utilize a celestial location. If a state was determined to interfere with another state's public or private entities in space and all available diplomatic and international procedures failed to resolve or diffuse the situation, it would signify a breakdown in international relations extending far beyond the specific space activity at issue.[113]

[109] Ibid
[110] Ibid
[111] Ibid; See Articles 5, 8.3 and 15.2 of the Moon Agreement.
[112] Ibid; see generally Article III, IV and V of the Liability Convention.
[113] Ibid at 294.

The rights of space entrepreneurs are still being developed, domestic regulations may be of help in the growth of the sector but domestic laws must align with international laws. All entities, whether private or states have the right to "occupy a location on a celestial body", subject to the rights of other states to visit and inspect the location and any other structures put in place.[114]

Under the United Nations, no legal or structural framework was put in place for dispute settlement but the Liability Convention had a "Claims Commission" included in its provisions. The decision of the Commission was not meant to be binding unless the parties agree to contrary terms.[115] Public international law's effectiveness in dealing with disputes around space activities is doubtful, in the light of the increased number of entities involved in space activities now. In 2011, the Optional Rules for Arbitration of Disputes Relating to Outer Space Activities drafted by the Permanent Court of Arbitration (PCA) also became effective.[116] Similarly, Article III of the OST had made provision for resolution of disputes in accordance with Article 33 of the UN Charter and Customary International Law.[117]

The Vienna Convention on the Law of Treaties applies to treaties interpretation and problems arising out of their application.[118] Article 31 gives the parties right of choice in how their conflicts are resolved, Williams noted that "in principle, a treaty should be applied in good faith, in accordance with the ordinary meaning of its terms and in the light of its object and purpose".[119] On the other hand, some measure of dispute resolution can be found in Article IX of the Outer Space Treaty, though it is limited in scope to the protection of the environment and international consultations in case of possibility of interference. Article IX is plagued with many definitional deficiencies making it open to

[114] Article XII of the Outer Space Treaty.
[115] Maureen Williams, 'Dispute Resolution Regarding Space Activities' in Frans von der Dunk and Fabio Tronchetti (eds) Handbook of Space Law (2015) Routledge
995.
[116] Ibid
[117] Charter of the United Nations, San Francisco, 26 June 1945, entered into for
[118] Article 31 of the Vienna Convention on the Law of Treaties
[119] Maureen Williams, supra n, at 1000.

lots of arguments and criticisms.[120] Ironically, the Vienna Convention did not offer much assistance on this issue. As described by Williams:

> The Vienna Convention on the Law of Treaties is not too clear on these points either. In fact, Article 66 on procedures for judicial settlement, arbitration and conciliation provides that any party to a dispute concerning the application or interpretation of any of the articles in Part V of the Convention may set in motion a procedure envisaged in the Annex to the Convention by submitting its request to the Secretary-General of the United Nations. This does apply to Articles 53 and 64 — dealing with peremptory norms of general international law – and the ICJ is to decide.[121]

The Secretary-General of the UN is vested with the duty of drawing up lists of notable jurists that can mediate in disputes referred to the Conciliation Commission. The decisions of the jurists are in the form of proposals made to the parties and the Secretary-General; the decisions of the Commission are not binding but are mere recommendations made to the parties.[122] Article XII and XIX of the Liability Convention dealt with issues of compensating a state for the damage caused by activities of another state in outer space and:

> …Refers to international law and principles of justice and equity in order to provide such reparation in respect of the damage as will restore the person, natural or juridical, state or international organization on whose behalf the claim is presented to the condition which would have existed if the damage had not occurred (which amounts to *restitutio in interim*).[123]

The concept of "international law" as stated the provisions of Article XII of the Liability Convention should not be difficult to comprehend as contained in Article 38 of the ICJ Statute. Other important concepts are also provided for by the Liability Convention, and resort can in addition be made to the Law of the Sea in interpretation such as the concepts of justice and equity.[124] Examples can be found in the Gulf of Maine Case decided in

[120] Ibid.
[121] Ibid; see generally the Vienna Convention on the Law of Treaties.
[122] See generally, the Liability Convention of 1972.
[123] Ibid.
[124] Ibid at 1009; *Norwegian Shipowners' Claims*, Norway v USA, 13 October 1922, Vol. XI, Reports of International Arbitral Awards (RIAA); ICJ Reports 1982, the Tunisia-Libya Continental Shelf Case, cited by Maureen Williams.

1984 and Guinea-Bissau Arbitration of 1986, showing that application of international laws, and

> the principles of justice and equity' had been applied by international courts alongside the provisions of the Liability Conventions. Williams noted that "these precedents – in addition to the weight they carried given their thorough examination by judges and arbitrators – were clearly showing a trend towards pragmatic solutions which would inspire generations of space lawyers.[125]

Article XIX of the Liability Convention taken together with other provisions are instrumental to settling disputes. The articles include settlement of dispute, negotiation process, claiming compensation and what happens in the event of failure in achieving settlement within a year, how the decision of the Commission is to be achieved and effect of the decision on the parties.[126] The deficiency of the Liability Convention lies in the no-binding clause inserted in it. An example is the Soviet Cosmos-954 case between Russia and Canada to which the Liability Convention should have been applied but the case had to be settled by the parties themselves directly. The space treaties along with other UN Principles[127] failed to include comprehensive dispute settlement mechanisms that can address the current and modern-day challenges of space activities. It was observed that

> …None of the UN instruments is consistent with today's world for the simple reason that only states and international intergovernmental organizations can be parties to dispute settlement procedures. Moreover, commercial activities have grown at unprecedented speed and an increasing number of developing countries are gradually accessing the latest space technology by means of agreements based on international cooperation.[128]

The PCA rules of 2011 offers more protection for new actors in space activities, it is flexible showing the realities of the problems facing the space sector, and can prove to be

[125] Ibid.
[126] See Articles I, XII, XIV and XVI of the Liability Convention.
[127] See Principle E of the Principles On Direct Television Broadcasting of 1982; Principle XV of the Principles on Remote Sensing of 1986 and Principle 10 of the Principles on the Use of Nuclear Power Sources in Space of 1992.
[128] Ibid at 1031

an instrument of addressing gaps in the law especially with regards to settlement of space conflicts.[129] The PCA is a more effective management mechanism for space dispute.

4.2 Resolving Conflicts between National Laws and International Laws on Space

National or domestic laws on space activities are meant to be drafted in compliance with the provisions of international laws and normally reflects a state's interpretation of international laws. Any ambiguities are cleared by resorting to international law, states' actions in applying international laws gives validation to the duties imposed on them by the provisions of the treaties.[130] While it was the two superpowers that dominated the initial space race, things have changed in the space-scape, with more states becoming space faring by the day, especially less developed states such as India, Mexico, Brazil and a handful of African states, space politics will not remain the same.

States must avoid authorizing and/or granting rights that will violate international laws in their domestic regulations because "if international consensus supports that states may authorize non-governmental entities, then numerous challenges are on the horizon".[131] A balance must be struck between protecting commercial interests in outer space and maintaining the outer space itself. Focus should be on maintaining the peace and security of outer space which had always been the foundation of the space treaties. It is important that in enacting domestic space laws, the following be taken into consideration:

> States should be aware of the risks of a "race to the bottom" in the enactment of such laws, similar to the flag of convenience problem on the high seas. Safety, security and sustainability for all space actors are all critical notions that states should give serious thought to when enacting local rules.[132]

States are to ensure the peaceful uses of outer space but putting the interests of other states into consideration by putting in place "mechanisms" that limits "harmful

[129] Ibid at 1032
[130] Blount and Robison at 178
[131] P. J. Blount, 'Outer Space and International Geography: Article II and the Shape of Global Order' (2018) New England Law Review, Vol.52, Iss.2, 95 at 121.
[132] Blount, supra n 125, at 121.

interference".[133] All activities on outer space must be for the benefit and in the interest of all mankind, and this would extend to private actors' involvements in space activities. Every interest (states, private actors' and non-governmental organisations') in outer space must be protected by international law but maintaining international peace and stability is to be given the utmost protection. Attainment of profits should not be allowed to upset international standards in the space sector.

5.1 Nigeria's Position in Relation to Outer Space Activities

The National Space Research and Development Agency Act (NARSDA) was established to regulate the country's space activities. Nigeria was the second country in Africa to have its own national regulations on space.[134] Nigeria had ratified four out of the five treaties on outer space and the principles enshrined in the treaties are binding on all space activities of the Nigerian state.[135] Amongst the goals of NASRDA was to

> Vigorously pursue the attainment of space capabilities as an essential tool for the socio-economic development and the enhancement of the quality of Nigerians.[136]

Having realized the importance of space exploration for socio economic developments of any nation, Nigeria embarked on various space projects since 1999.[137] NASRDA is in charge of all space activities in Nigeria and has as part of its goals, the plan to send Nigerian astronauts to space by the year 2030.[138] Africa as a continent stands to gain a lot from space technology as already shown by other industrialised states. Nigeria being one of the few states in Africa to have space capabilities stands to play a vital role in the development of space.

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[133] Ibid, at 122

[134]Frans G, Von der Dunk, "The Second African National Space Law: The Nigerian NARSDA Act and the Draft Regulation on Licensing and Supervision" (2017) Space, Cyber and Telecommunications Law Program Faculty Publications, 92 <http://digitalcommons.unl.edu/spacelaw> accessed 15/02/2024.

[135] Ibid.

[136] See the NASRDA Act.

[137] Olisa Agbakoba Legal, 'Space Development in Nigeria' (OAL, 14 April,2022) https://oal.law/space-development-in-nigeria/ accessed 20/02/2024.

[138] Ibid

States in Africa have invested billions of dollars on satellites technology, and more investments have followed since Covid-19 pandemic, this is due to the increased need for data from space.[139] It appears that states in Africa are beginning to appreciate the essence of space technology and are increasingly investing in space satellites. The number of satellites from African states in space had grown exponentially, and additional African states have ratified the space treaties in recent years.[140]

The Nigerian government invested huge sum of money in the sector in order to place Nigeria as a leading force in Africa's space journey, it is quite unfortunate that other than launching few satellites into space, Nigeria has not achieved much in the space sector. Part of the problems facing Nigeria's space sector is the political unrest that had plagued the nation for a long time. The corruption that is endemic in the political scape had also reared its ugly head in the space sector. Despite the huge amounts of investments in the sector, there is little to show for the investments.

Nigeria launched its first satellite, NigeriaSat-1 into space in 2003 but the satellite has since being decommissioned. Other satellites have also been launched and in 2006, the Nigerian Communications Satellite (NIGCOMSAT) was created with the purpose of managing Nigeria's communication satellites.[141] The body was placed under the charge of the Ministry of Communication and Digital Economy.[142] Unsurprisingly, NIGCOMSAT has not achieved any substantial thing, other than the trainings for military personnel and relevant ministries.

In relation to the private sector, the space sector in Nigeria had not witnessed much progress, the focus had mainly been on the military. The creation of the Defence Space Act[143] and Defence Space Administration led to the collaboration between NIGCOMSAT and NASRDA that had seen the bodies providing important trainings for the military. The

[139] Ibid
[140] UNOOSA, 'Growth of Committee Membership and Universalisation of the Five United Nation Treaties on Space Law' (2025) https://share.google/FaJ2sadaLECz5ulCD accessed 27/10/2025
[141] NigComSat-1 <https://share.google/on9c3HMIJwQQBMDaF> accessed 27/10/2025.
[142] Ogheneruemu Oneyibo, 'After 23 Years, Nigeria's Space Ambitions Still Look Like a Pipe Dream' (Tech Point, 27 January, 2022) <https://techpoint.africa/2022/01/27/nigerias-space-ambitions-pipe-dream/> accessed 20/02/22.
[143] The Defense Space Act (DSA) was established in 2016.

Nigeria Space Policy is in place for the implementation of the space policies. The Nigerian space regulation is modelled after private- public initiative with different plans to wit

> Short term, the government is responsible for all investments in space technology development. Medium term, the government implements the partial commercialization of NASRDA's products and services developed during the short-term economic development plan. Long term, the government partners with the private sector to implement the public-private partnership framework for the space programme.[144]

The nation has witnessed few milestones: the launched satellites are still working years after they should have been decommissioned, some collaborative works are being done by NASRDA and higher institutions like the Federal University of Technology Akure (FUTA); trainings have been organized for military engineers but no success has been recorded in launching an astronaut into space.[145]

In conclusion, there are many possibilities for African states in outer space, but the states must be willing to do more by taking advantage of international law in order to reposition Africa especially Nigeria in the global space sector. In addition, African states must collaborate in order to achieve their goals of exploiting the resources of the outer space and join the league of nations actively involved in outer space activities, this is as exemplified by the European Space Agency (ESA).

[144] Ibid

[145] Kieron Monks, 'Nigeria Plan to send an Astronaut to Space by 2030' (CNN, 06 April, 2016) <https://amp.cnn.com/cnn/2016/04/06/nigeria-nasrda-space-astronaut/index.html> accessed 20/02/2024.