



EXPLORING THE FRONTIER:
**EVOLUTION AND
REGULATION OF SPACE
TECHNOLOGY**



INTRODUCTION

Space technology¹ has long captivated the imagination of humanity, representing the ultimate frontier of exploration and innovation. From the early days of the Space Race² to the present era of commercial space ventures, the evolution of space technology has been characterized by remarkable achievements and rapid advancements³. However, along with these advancements comes the need for robust regulation to ensure safety, security, and responsible use of outer space. This article delves into the evolution of space technology, examines international regulations governing space activities, and discusses the regulatory landscape in Nigeria with insights into the efforts of organizations such as the World Intellectual Property Organization (WIPO) and the International Trademark Association (INTA).

EVOLUTION OF SPACE TECHNOLOGY

The journey of space technology began in the mid-20th century with the launch of the first artificial satellite, Sputnik 1, by the Soviet Union in 1957.⁴ This historic event was followed by the launch of Explorer-1 by the USA on 31st January, 1958. In April 1961, Yuri Gagarin from the Soviet Union became the first human to go into space. United States of America followed immediately with Alan Shepard' becoming the first American and the second man in space on 5th May, 1961. Soon after, on 20th July, 1969, Neil Armstrong also from the United States of America became the first man to walk on the moon.

¹ Space technology simply put means technology for use in outer space. It includes space vehicles such as spacecraft, satellites, space stations and orbital launch vehicles; deep-space communication; in-space propulsion; and a wide variety of other technologies including support infrastructure equipment, and procedures.

² The Space Race was a 20th-century competition between two Cold War rivals, the United States, and the Soviet Union, to achieve superior spaceflight capability.

³ NASA's 10 Greatest Achievements, <<https://science.howstuffworks.com/ten-nasa-achievements.htm>>, accessed on 9th March, 2024.

⁴ The world's first artificial satellite was about the size of a beach ball (58 cm, or 22.8 inches in diameter), weighed only 83.6 kg, or 183.9 pounds and took about 98 minutes to orbit the Earth on its elliptical path.

Since then, space technology has advanced rapidly; driven by scientific curiosity, commercial interests, and national security imperatives. Satellites have become indispensable tools for communication, navigation, Earth observation, and scientific research. The advent of reusable rocket technology, pioneered by companies like SpaceX, has revolutionized space access, making launches more frequent and cost-effective. Meanwhile, ambitious projects such as the International Space Station (ISS) demonstrate international collaboration in space exploration and research.⁵



GLOBAL REGULATION OF SPACE ACTIVITIES

The conduct of space activities is governed by a complex web of international treaties, agreements, and regulations aimed at promoting peaceful and responsible use of outer space. The cornerstone of space law is the Outer Space Treaty,⁶ adopted by the United Nations in 1967. This law establishes principles such as the exploration and use of outer space for the benefit of all countries, the prohibition of military activities on celestial bodies, and the prevention of harmful contamination of space.

In addition to the Outer Space Treaty, other key international agreements include the 1968 Rescue Agreement,⁷ 1972 Liability Convention International Liability for Damage Caused by Space Objects,⁸ and Convention on Registration of Objects Launched into Outer Space,⁹ which address aspects such as the rescue and return of astronauts, liability for damage caused by space objects, and the registration of space objects, respectively. It is also worthy to mention the 1979 Moon Treaty¹⁰ which provides that the Moon and other celestial those should be

⁵ "The future space economy is booming. What benefits can it bring to Earth?" <<https://www.linkedin.com/pulse/future-space-economy-booming-what-benefits-can-bring-earth-santosh-g-hsfqc/>>, accessed on 25th March, 2024.

⁶ United Nations Office for Outer Space Affairs, "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies" <<https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introouterspacetreaty.html>>, accessed on 9th March, 2024.

⁷ The Rescue Agreement was considered and negotiated by the Legal Subcommittee from 1962 to 1967. The Agreement, elaborating on elements of articles 5 and 8 of the Outer Space Treaty, provides that States shall take all possible steps to rescue and assist astronauts in distress and promptly return them to the launching State, and that States shall, upon request, aid launching States in recovering space objects that return to Earth outside the territory of the Launching State.

⁸ The Liability Convention provides that a launching State shall be liable to pay compensation for damage caused by its space objects on the surface of the Earth or to aircraft, and liable for damage due to its faults in space. The 1972 Convention on International Liability for Damage Caused by Space Objects.

⁹ The Convention on Registration of Objects Launched into Outer Space was adopted by the United Nations General Assembly in 1974 and went into force in 1976. As of February 2022, it has been ratified by 72 states.

¹⁰ United Nations Office for Outer Space, "Agreement Governing the Activities of States on the Moon and Other Celestial Bodies" <<https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/intromoonagreement.html>>, accessed on 9th March 2024.

used exclusively for peaceful purposes and that the United Nations should be informed of the location and purpose of any station established on those bodies.

There also exist specific regulations on licensing and supervision of space activities such as the 1977 Geneva Convention on the Prohibition of Military or any other Hostile use of Environmental Modification Techniques and the 2002 Hague Code of Conduct against Ballistic Missile Proliferation. Furthermore, organizations like the United Nations Office for Outer Space Affairs (UNOOSA) play a crucial role in facilitating cooperation and coordination among spacefaring nations.



SPACE TECHNOLOGY IN NIGERIA

Nigeria has made remarkable strides in the field of space technology, demonstrating a commitment to harnessing the potential of space for socioeconomic development. Central to this progress is the National Space Research and Development Agency (NASRDA), established in 1999, which spearheads the nation's efforts to explore and leverage space technology,¹¹ and the National Space Policy which was approved in 2001 by the Federal Government of Nigeria.¹² Notably, a milestone moment occurred in 2003 with the launch of Nigeria's first satellite, NigeriaSat-1. This achievement marked Nigeria as one of the few African nations with satellite capabilities, opening new avenues for advancements in communication, Earth observation, and scientific research.¹³

In the realm of legal protection, efforts have been made to bolster our legal framework for Space Technology protection. The National Space Research and Development Agency Act (NASRDA) of 2010 established the National Space Council. The striking provision under the NASRDA Act is the establishment of a

¹¹ NASRDA, "Our Historical Background", <https://www.nasrdacbs.com/our-historical-background/>, accessed on 9th March, 2024.

¹² The Nigerian national space policy commits Nigeria to actively pursue space capabilities. It aims to enhance socio-economic development and improve quality of life through research, education, engineering, and the development of space technology hardware and software.

¹³ Aero Space Security, "Challenges and Opportunities of Nigeria's Space Program" [24th June 2020] <https://aerospace.csis.org/challenges-and-opportunities-of-nigerias-space-policy/>, accessed on 9th March, 2024.

licensing system for public sector involvement in Nigerian space activities and the maintenance of a register of space objects, enabling compliance with international obligations.¹⁴

Furthermore, there is the 2015 Regulation on Licensing and Supervision of Space Activities. This Regulation aims to amend the NASRDA Act and strengthen regulatory measures for space activities in Nigeria. It introduces a new licensing regime, empowering the Agency to license all entities or corporations operating space objects in Nigeria. This ensures compliance, responsibilities, and ethical practices in the space domain. Thus, by enforcing these regulations, the Agency aims to foster growth and encourage private sector involvement in the industry.¹⁵



Intellectual Property Protection for Space Technology: World Intellectual Property Organization (WIPO) And International Trademark Association (INTA) efforts In Space Regulation

Space technology represents leading-edge innovation, with outer space endeavors as intellectual achievements. Recently, intellectual property protection in space activities gained prominence due to the shift from state-owned to private and commercial ventures. This includes remote sensing, direct broadcasting, and research in micro-gravity environments¹⁶. In the same vein, safeguarding intellectual property rights (IPR) is crucial for nurturing innovation, encouraging investment, and facilitating the sustainable expansion of the space industry and exploration beyond earth. However, protecting these rights presents a considerable challenge, as existing IPR laws are anchored in principles of territoriality and sovereignty, which do not readily extend to outer space and celestial bodies.¹⁷ Recognizing these challenges, organizations like WIPO and INTA

¹⁴Ibid.

¹⁵NASRDA, "Regulations on Licensing and Supervision of Space Activities", <https://central.nasrda.gov.ng/?page_id=2602> accessed on 9th March, 2024.

¹⁶International Bureau of WIPO, "Intellectual Property and Space Activities", [April 2004].

¹⁷Confederation of Indian Industry, "Protecting Intellectual Property Rights in Outer Space", <https://www.cii.org.in/protecting-intellectual-property-rights-in-outer-space/#:~:text=Challenges%20in%20Applying%20IPR%20to%20Outer%20Space&text=Territoriality%20and%20sovereignty%20are%20at,untenable%20in%20the%20existing%20framework>. Accessed on 9th March, 2024.



have acted by developing reports and policies specifically tailored to safeguard IPRs associated with innovations arising from space technology. Together, they have presented robust reports and recommendations dedicated to resolving disputes and addressing conflicts arising from breaches of IPRs linked to these space innovations. WIPO and INTA stand at the forefront, spearheading global initiatives to establish comprehensive regulatory frameworks for protecting advancements in space exploration.

i. Efforts of WIPO in Space Regulation: WIPO, a specialized agency of the United Nations, actively engages in shaping international policies for IP protection. One major policy is **the Issue paper prepared by the International Bureau of WIPO in 2004** on Intellectual Property and Space Activities.¹⁸ In this Policy WIPO recommends enhancing legal certainty in intellectual property protection for space activities to support public/private collaborations. WIPO advocates for global agreements to address jurisdictional issues and proposes a unified legal framework for space and its accessories. WIPO emphasizes the importance of harmonizing national intellectual property laws internationally to streamline patent system access and facilitate the collective utilization of space technology resources.¹⁹

Furthermore, WIPO advocates the extension of the Madrid Protocol to cover outer space jurisdictions, enabling members to extend trademark protection to Earth's orbit, the moon, and Mars. Alternatively, creating a new treaty or amending existing ones can safeguard trademarks for space inventions, defining scope and enforcement mechanisms, while utilizing WIPO's Arbitration and Mediation Center for dispute resolution of disputes arising from space activities.

ii. Efforts of INTA in Space Regulation: The INTA, known for its focus on trademarks and related IP issues, plays a pivotal role in the evolving landscape of space regulation. INTA acknowledges the importance of branding and trademark protection in the space industry, where distinctive marks and logos associated with space missions, satellites, and space-related products need safeguarding. The association actively participates in discussions and initiatives that address the unique challenges of trademark

¹⁸ International Bureau of WIPO, "Intellectual Property and Space Activities", [April 2004].

¹⁹ WIPO, "Trademarks in outer space: supporting the off-world economy", https://www.wipo.int/wipo_magazine/en/2021/04/article_0005.html accessed on 9th March 2024.

protection beyond Earth. INTA in contributing to the discussion for the protection of inventions in outer space conducted a report and made some recommendations that can be implemented between the periods of 2030 – 2050, which included the expansion of the Madrid System to cover outer space, creating an Outer Space Intellectual Property Office (OSIPO), and extending national laws to space. Additionally, they propose using contracts, databases, existing courts, and arbitration centers for IP protection and the creation of new Arbitral Tribunals or Space Court versed in the resolution of disputes emanating from space activities. In the medium term, they recommend expanding space treaties and creating new arbitration systems. In the long term, they propose a new IP treaty for space and local IP registries for enforcement.²⁰


Nigeria's membership in WIPO, coupled with active participation from INTA-affiliated legal practitioners, underscores its leadership role in advocating for comprehensive regulation of IPRs in space activities and technology. Thus, the implementation of the reports from WIPO and INTA by the United Nations will be beneficial to Nigeria as one of the countries invested in building formidable regulations for space activities and technology.



CONCLUSION

As humanity continues to push the boundaries of exploration and innovation into the final frontier of space, the evolution of space technology and the regulatory frameworks governing it become increasingly paramount. The need for robust regulation to ensure the safety, security, and responsible use of outer space cannot be overstated. International treaties and agreements, such as the Outer Space Treaty, lay the foundation for peaceful and responsible space exploration,

²⁰ INTA, "IP in Space: a report from the IP in Space Project Team" [December 2022].



while organizations like WIPO and INTA play pivotal roles in shaping comprehensive regulatory frameworks for intellectual property protection in space activities. Nigeria's strides in space technology, bolstered by initiatives such as the NASRDA Act and the 2015 Regulation on Licensing and Supervision of Space Activities, underscore its commitment to harnessing the potential of space for socioeconomic development. With active participation in WIPO and INTA discussions, Nigeria demonstrates its leadership in advocating for robust regulation of intellectual property rights in space. The implementation of recommendations from WIPO and INTA reports by the United Nations holds promise for Nigeria and other countries invested in building formidable regulations for space activities and technology, paving the way for a sustainable and prosperous future in outer space exploration and utilization. However, Nigeria needs to revise and amend The NASDRA Act and the 2015 Regulation on Licensing and Supervision of Space Activities to cover the rising prevalence of space activities worldwide.

As we know that space activities such as the Proposed Space Hotel, Voyager Station,²¹ is already underway and Nigeria should take a cue from developed countries. The United States used its Patent Act under Section 105 to cover space relations; it states that any invention made, used, or sold in outer space on a space object or component thereof under the jurisdiction or control of the United States shall be considered to be made, used or sold within the United States. The United Kingdom enacted The Space Industry Act that applies to anyone intending to carry out space activities and sub orbital activities in the UK the act acts as a framework that covers space related activities. From the above, when comparing the provisions of these legislations mentioned above with Nigeria's Framework on Space Activities, one can say that Nigeria NASDRA and the 2015 Regulation on Licensing and Supervision of Space Activities, falls short of the necessary provisions and principles needed to cover the recent developments in space activities and as such be revised to meet the present realities of space activities.

²¹ The **Voyager Space Station** or **Voyager Station** is a proposed rotating wheel space station, planned to start construction in 2026. The space station aims to be the first commercial space hotel.

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