

The African Space Agency and the Harmonisation of National Space Laws in Africa: Legal Challenges

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Annotation: The rapid development of satellite communications, Earth observation, navigation, space science and commercial space activities has increased the need for effective legal governance across Africa. Although African states participate in international space law through the United Nations treaty framework and the African Union's Space Policy and Strategy, differences in national legislation, institutional capacity and regulatory implementation create challenges for coordinated space activities. The African Space Agency (AfSA) presents an opportunity to strengthen continental cooperation, promote common regulatory approaches and support the development of a more coherent African space sector. However, the existence of a continental space institution does not automatically produce uniform national legislation or confer unrestricted legislative authority over member states. This paper examines the legal and institutional foundations for harmonising national space laws in Africa, with particular attention to international space treaties, African Union policy instruments and selected national legal frameworks. Using doctrinal legal research and comparative legal analysis, the paper identifies challenges relating to treaty implementation, licensing, registration, liability, supervision of private operators, space debris mitigation and institutional coordination. It argues that a practical approach based on minimum common legal standards, model legislation, regulatory cooperation and capacity building offers a more feasible path than complete uniformity of national laws. The paper recommends that the African Union and AfSA support the development of an African model space law and a coordinated implementation framework that respects national sovereignty while strengthening regional cooperation.

Key words: African Space Agency; African Union; space law; legal harmonisation; international space law; satellite regulation.

Introduction

Space science and technology have become increasingly important to economic development, environmental management, communication, navigation, agriculture, disaster risk reduction and national security. Satellite-based technologies support weather forecasting, natural resource assessment, telecommunications, urban planning and the monitoring of environmental change [1], [2]. For African countries, these technologies offer opportunities to address developmental challenges, improve public services and strengthen scientific capacity. However, the expansion of space activities also creates complex legal questions. States must establish appropriate mechanisms for authorising and supervising space activities, registering space objects, addressing liability for damage, protecting sensitive information and ensuring that national operators comply with applicable international obligations. These issues have become more significant as space activities expand beyond traditional government programmes to include commercial operators, private satellite companies and

international partnerships. International space law provides the principal legal framework for regulating activities in outer space. The Outer Space Treaty of 1967 establishes fundamental principles, including the freedom of exploration and use, non-appropriation, state responsibility for national space activities and the obligation to authorise and continuously supervise relevant non-governmental activities [3]. Other treaties address the rescue of astronauts, liability for damage caused by space objects, registration of space objects and activities on celestial bodies [4],[5],[6],[7]. Nevertheless, international treaties do not eliminate the need for national legislation. States require domestic laws and institutions to translate international obligations into operational rules for government agencies, private companies and other relevant actors. Differences in domestic regulatory arrangements may complicate cross-border cooperation and create uncertainty for organisations operating in several jurisdictions. At the continental level, the African Union has developed a Space Policy and Space Strategy intended to support cooperation and the use of space science and technology for Africa's development. The African Space Agency represents an important institutional development in this process. Its establishment provides a framework for strengthening continental coordination, facilitating cooperation and supporting the implementation of African space priorities. However, the relationship between continental coordination and national legislative authority requires careful examination. The African Space Agency should not automatically be understood as possessing direct legislative power over every African state. The extent of its authority depends on the applicable African Union legal instruments, institutional arrangements and decisions of member states. This distinction raises an important research problem: how can Africa develop a coherent space law framework when countries differ in their national legislation, treaty participation, regulatory institutions and technical capacities? This paper addresses that question by examining the role of AfSA in promoting legal harmonisation, identifying regulatory and institutional gaps, and proposing practical measures for strengthening regional space governance.

Methodology

This study adopts a qualitative doctrinal and comparative legal research methodology to examine the role of the African Space Agency (AfSA) in promoting the harmonisation of national space laws across African states. The methodology is designed to assess the existing international and continental legal frameworks, identify differences in national regulatory arrangements, and propose practical measures for strengthening legal coordination. It combines legal document analysis with a comparative assessment of selected African countries.

Research Design

The study employs a descriptive and analytical research design. The descriptive component outlines the principal international treaties, African Union policy instruments and national legal frameworks governing space activities. The analytical component examines the legal obligations of states, the institutional mandate of AfSA, and the extent to which existing regulatory arrangements support or constrain harmonisation. The comparative component identifies similarities and differences among selected national frameworks to determine potential areas for common regulatory standards.

Sources of Data

The study relies primarily on secondary documentary sources. These include international space treaties, African Union legal instruments, the African Union Space Policy and Space Strategy, national legislation, official government publications, institutional reports, academic books and peer-reviewed journal articles. Particular attention is given to the Outer Space Treaty of 1967, the Liability Convention of 1972, the Registration Convention of 1975, the Moon Agreement of 1979, the Statute of the African Space Agency and relevant national legislative instruments.

Conceptual and theoretical framework

Space law comprises international and domestic legal rules governing the exploration and use of outer space, space objects, space activities and the conduct of relevant public and private actors [8]. It includes international treaties, customary international law where applicable, national legislation, regulations and institutional arrangements. International space law establishes fundamental principles governing state conduct. Domestic space law provides the legal mechanisms through which states authorise, supervise and regulate space activities within their jurisdiction or control. A functioning national space law framework may address licensing, registration, insurance, liability, continuing supervision, environmental protection, the use of satellite data and the regulation of private space operators. The precise content of national legislation depends on each state's activities, legal system and international obligations. Nevertheless, some common legal requirements can improve consistency and facilitate cooperation.

Legal harmonisation and uniformity

Legal harmonisation refers to the process of making different legal systems more compatible by aligning selected principles, standards, procedures or substantive rules [9]. It does not necessarily require every participating state to adopt identical legislation. Legal uniformity, by contrast, involves the adoption of substantially identical rules across jurisdictions. Although uniformity may be appropriate in particular contexts, it can be difficult to achieve across a continent characterised by different constitutional arrangements, legal traditions and administrative capacities. For African space governance, harmonisation may be more practical than complete uniformity. Countries could maintain their national space agencies and legislative authority while adopting common minimum standards for licensing, registration, liability, supervision and space debris mitigation. Harmonisation may occur through model laws, common guidelines, regional agreements, legislative amendments, administrative cooperation and the exchange of regulatory information.

Institutional cooperation and multilevel governance

Multilevel governance provides a useful analytical perspective for examining the relationship between international institutions, continental organisations and national governments [10]. In the African space sector, international treaties establish global obligations, the African Union provides regional policy and institutional arrangements, and national authorities implement applicable legal requirements. The effectiveness of this structure depends on coordination between the different levels of governance. A regional institution can facilitate cooperation and develop common standards, but its practical influence depends on its legal mandate, resources, institutional relationships and the willingness of member states to implement agreed measures. Accordingly, this paper approaches legal harmonisation as a process of coordinated regulatory development rather than the automatic transfer of national legislative powers to a continental institution.

The Outer Space Treaty, 1967

The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, commonly known as the Outer Space Treaty, is the foundation of modern international space law. Article I recognises the freedom of exploration and use of outer space by all states, subject to international law. Article II prohibits national appropriation of outer space. Article III requires space activities to be conducted in accordance with international law, including the Charter of the United Nations. Article VI is particularly important for national legislation because it establishes international responsibility for national activities in outer space, including activities carried out by non-governmental entities. Such activities require authorisation and continuing supervision by the appropriate state. Article VII addresses international liability for damage caused by a space object, while Article VIII addresses jurisdiction and control over registered space objects.

These provisions demonstrate why African states require appropriate domestic regulatory frameworks. National legislation can establish the institutions, licensing requirements and supervisory procedures necessary to implement relevant treaty obligations. The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space establishes obligations concerning assistance to astronauts and the return of space objects under specified circumstances. Although rescue operations may appear remote from the everyday regulatory needs of many African states, the agreement remains relevant to international cooperation and the responsibilities of states that host tracking facilities, launch-related infrastructure or other space activities.

The Liability Convention, 1972

The Convention on International Liability for Damage Caused by Space Objects establishes rules concerning international liability for damage caused by space objects. It distinguishes between damage caused on the surface of the Earth or to aircraft in flight and damage occurring elsewhere than on the Earth's surface. The Convention provides an important international framework for claims involving damage attributable to space objects. For African countries, domestic legislation can complement this framework by clarifying the responsibilities of licensed operators, insurance requirements where appropriate, reporting obligations and procedures for cooperation with national authorities. However, domestic legislation should not be confused with the Convention's separate rules governing international claims between states.

The Registration Convention, 1975

The Convention on Registration of Objects Launched into Outer Space supports the identification of space objects through national and international registration arrangements. Registration is important for identifying the state of registry and facilitating the application of jurisdiction and control under international space law. African states participating in satellite programmes should establish clear procedures for determining registration responsibilities, maintaining national records and providing the information required under applicable international arrangements.

The Moon Agreement, 1979

The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies addresses activities on the Moon and other celestial bodies. Its participation is substantially more limited than that of the principal space treaties. Its relevance to African space law should therefore be assessed in light of the treaty participation of individual states and the extent to which its provisions apply to the activities under consideration. The international legal framework establishes important common principles, but its effective implementation requires national institutions and procedures.

The African Union Space Policy and Space Strategy

The African Union's Space Policy and Space Strategy provide a continental framework for the use of space science and technology in support of Africa's development objectives. The policy framework recognises the importance of coordinating African space activities, developing institutional capacity, strengthening cooperation and improving access to space-based services. These objectives are relevant to communications, environmental monitoring, agriculture, disaster management, climate services and scientific research. Nevertheless, a continental policy instrument does not necessarily create directly enforceable legal duties in every member state. Its legal effects must be assessed according to the nature of the instrument, the relevant African Union legal framework and the measures adopted by member states. This distinction is central to the present study. The promotion of common policy objectives is an important step towards harmonisation, but effective legal coordination also requires appropriate implementation mechanisms.

The role of the African Space Agency

The African Space Agency was established within the African Union's continental space governance framework, with its institutional development supported by the African Union's Space Policy and Space Strategy and the relevant founding instruments [11]. Its development reflects the recognition that coordinated space programmes can support scientific cooperation, improve the use of satellite applications and strengthen Africa's position in the global space sector. In relation to legal harmonisation, AfSA can potentially contribute by facilitating dialogue among national space agencies, supporting the development of common regulatory guidelines, encouraging the exchange of legal and technical expertise and identifying areas where compatible national rules would improve cooperation. However, the extent of AfSA's formal authority must be established from its applicable founding instruments and institutional mandate. The agency should not be presumed to have a general power to enact binding legislation for all African countries without a demonstrated legal basis.

AfSA and national space agencies

National space agencies play important roles in implementing domestic space programmes, coordinating research, developing satellite applications and supporting government policy. In Nigeria, for example, the National Space Research and Development Agency operates within the national space institutional framework established by the National Space Research and Development Agency Act [12]. Comparable institutions exist in other African countries, although their mandates, resources and regulatory responsibilities differ. AfSA's continental role should complement, rather than automatically replace, national institutions. National authorities remain important to the implementation of domestic legislation, authorisation procedures and supervision of activities falling within their respective legal responsibilities. A cooperative relationship could allow national agencies to share regulatory experience, develop common technical standards and identify areas where legislative compatibility would reduce unnecessary barriers to regional projects.

Comparative assessment of selected African national frameworks

A comparative assessment of African space law must distinguish between countries with dedicated space legislation, countries with broader statutory arrangements and countries whose regulatory frameworks may be distributed across multiple legal instruments. The following countries provide a useful starting point for a comparative study. The precise legal instruments, amendments and treaty status applicable to each country should be verified against official legal sources before journal submission.

Nigeria

Nigeria has developed a national space programme through the National Space Research and Development Agency and related government initiatives. Its space activities support satellite communications, Earth observation, environmental monitoring and other development priorities. Nigeria's legal framework provides a useful case study for examining how national space institutions interact with domestic law and international space obligations. The key questions for comparative research include the scope of NASRDA's statutory mandate, the allocation of responsibilities for licensing and supervision, the implementation of international obligations, and the adequacy of domestic arrangements for emerging commercial space activities. Nigeria's experience may also offer lessons for countries seeking to strengthen their regulatory frameworks without duplicating existing institutions.

South Africa

South Africa has developed a more established national space regulatory framework, including legislation addressing space affairs and the activities of space operators. The South African National

Space Agency operates within a broader national institutional environment that includes the regulation of relevant space activities. South Africa is therefore a useful comparator for assessing the relationship between national space institutions, statutory authorisation mechanisms and the implementation of international obligations. A detailed comparison should examine the Space Affairs Act 84 of 1993, as amended, and related regulations, including the responsibilities assigned to the relevant national authorities [13], [14].

Algeria

Algeria has invested in satellite technology, Earth observation and the development of national space capabilities. Its experience provides a useful perspective on the relationship between state-led space programmes, national development priorities and the legal arrangements governing space activities. The Algerian case can help identify how national institutional structures and administrative arrangements address international obligations and regulatory oversight. A careful assessment should distinguish between institutional or policy measures and legislation that establishes enforceable legal requirements.

Egypt

Egypt has developed space science and satellite capabilities and has participated in regional and international space initiatives. Its institutional experience provides another useful basis for examining the governance of satellite programmes and the relationship between national and continental cooperation. The Egyptian framework should be assessed by identifying the relevant legislation, executive instruments, institutional mandates and regulatory procedures applicable to space activities. This analysis would help determine whether particular legal mechanisms could inform the development of common African regulatory standards.

Kenya

Kenya's developing space sector provides an important perspective on the regulatory needs of countries expanding their space science and satellite activities. Its experience is particularly relevant to the relationship between national space institutions, scientific capacity building, international cooperation and the development of appropriate domestic regulatory arrangements. The Kenyan case may help identify practical regulatory priorities for countries seeking to expand space activities while strengthening legal certainty and institutional capacity. The selected countries demonstrate why harmonisation should begin with a structured assessment of existing national arrangements rather than an assumption that every country has the same regulatory gaps.

Legal and institutional challenges to harmonisation

One of the principal challenges to harmonisation is the uneven development of national space law. Some states have dedicated legal instruments, while others may rely on general legislation, administrative procedures or institutional mandates that do not comprehensively address modern space activities. These differences can create uncertainty regarding licensing, supervision, liability and the responsibilities of private operators. A continental model law could help address these inconsistencies by identifying the minimum legal provisions that states may incorporate into their domestic systems. However, such a model should allow states to adapt its provisions to their constitutional arrangements, legal traditions and national priorities. Effective space regulation requires legal expertise, technical knowledge, administrative resources and the ability to monitor increasingly complex activities. Some countries may face difficulties in maintaining specialist regulatory institutions or developing comprehensive domestic legislation. These limitations may be particularly important as private operators and new satellite technologies increase the range of activities requiring oversight. AfSA and relevant continental institutions could support training programmes, regulatory exchanges, shared technical resources and the development of model administrative procedures. Space activities are

closely connected to national security, telecommunications, scientific development and economic interests. States may therefore be reluctant to adopt arrangements perceived as limiting their regulatory independence. Harmonisation should not be understood as requiring the transfer of all national regulatory authority to a continental institution. A more workable approach would establish common minimum standards while allowing states to retain authority over national licensing decisions, security-sensitive matters and domestic enforcement, subject to their applicable international and regional obligations.

Regulation of private and commercial operators

The expansion of commercial satellite services and private space activities creates new regulatory demands. Under Article VI of the Outer Space Treaty, states bear international responsibility for national activities in outer space, including activities conducted by non-governmental entities. The treaty also requires appropriate authorisation and continuing supervision of such activities. National legislation must therefore provide effective mechanisms for regulating relevant private operators. Differences in national licensing procedures, financial responsibility requirements and supervision may complicate cross-border commercial activities. Common regulatory principles could improve transparency and predictability without requiring identical administrative structures.

Prospects for a harmonised African space law framework

An African model space law would provide a practical starting point for improving the compatibility of national legal frameworks, consistent with comparative work on national space legislation and implementation of treaty obligations [15]. It could identify minimum provisions on authorisation, continuing supervision, registration, liability, insurance where appropriate, operator reporting and space debris mitigation. The model could also address the responsibilities of national authorities, compliance procedures and the treatment of commercial space activities. To be effective, its development should involve national governments, legal experts, space agencies, technical institutions, commercial operators and other relevant stakeholders. A model law would not automatically become binding on African states. Its legal effect would depend on the process through which states adopt or implement its provision

Regional challenges and dispute prevention

Differences in interpretation and implementation may create disputes involving space activities, licensing decisions or cross-border projects. African states could strengthen consultation and cooperation mechanisms to address regulatory disagreements at an early stage. Any formal dispute-resolution arrangement would need a clear legal basis and the agreement of participating states. AfSA's role in such processes should be determined by its actual mandate and the applicable African Union instruments.

Results and Discussion

The comparative assessment indicates that harmonising African space law requires a coordinated approach that recognises differences in national legislation, institutional structures and regulatory capacity. The international space treaties establish common principles concerning state responsibility, liability, registration and the regulation of national space activities. However, the implementation of these principles depends on the domestic legal and administrative arrangements adopted by individual states. Consequently, the existence of an international legal framework does not automatically ensure consistent regulatory practices across African countries.

The assessment of Nigeria, South Africa, Algeria, Egypt and Kenya demonstrates the importance of examining national space governance in relation to each country's legislative framework, institutional development and space-related priorities. Nigeria provides a relevant case for examining the statutory

responsibilities of a national space agency and the implementation of international obligations. South Africa offers a useful comparator because of its established statutory framework for space affairs and national space institutions. Algeria, Egypt and Kenya provide additional perspectives on the relationship between developing space capabilities, national institutional arrangements and the need for effective regulatory oversight. Nevertheless, these cases should not be interpreted as a definitive ranking of national legal systems. A comprehensive comparison requires verification of current legislation, relevant amendments, treaty participation and the allocation of regulatory responsibilities in each jurisdiction.

Conclusion and Recommendations

The harmonisation of national space laws is an important consideration in the development of a coordinated and sustainable African space sector. International space treaties establish common principles concerning state responsibility, liability, registration and the conduct of activities in outer space. However, the practical implementation of these principles depends substantially on national legislation, administrative institutions and regulatory procedures. The African Union's Space Policy and Space Strategy provide a continental framework for cooperation, while the African Space Agency offers an institutional opportunity to strengthen coordination among African states. Nevertheless, the existence of a continental agency does not by itself eliminate differences in national law or establish unrestricted authority to enact binding legislation for member states. The principal challenge is therefore to develop a workable relationship between international obligations, continental coordination and domestic implementation. Differences in legislation, treaty participation, institutional capacity and regulatory priorities make complete uniformity difficult to achieve. A more practical approach would focus on minimum common standards, model legislation, regulatory cooperation and capacity building. Ultimately, effective harmonisation should seek to improve legal certainty, strengthen accountability and support responsible space activities without disregarding national sovereignty. Through coordinated legal development and sustained institutional cooperation, African states can improve their capacity to participate in the global space economy and use space science and technology to advance continental development. The African Union, working with AfSA and member states within their respective mandates, should consider developing a model space law that identifies minimum standards for the regulation of national space activities. A systematic assessment should document national space legislation, institutional responsibilities, relevant treaty participation and implementation arrangements across African states. A continental network could facilitate knowledge exchange, comparative research and cooperation among national authorities. African states should review whether their existing legislation and administrative procedures adequately implement the international obligations applicable to them. States should consider compatible approaches to licensing, operator supervision, registration, financial responsibility and reporting requirements. National regulatory frameworks should address relevant space debris mitigation practices, operator responsibility and the long-term sustainability of space activities.

References

- [1] African Union Commission, *African Space Policy and Strategy*. Addis Ababa, Ethiopia: African Union Commission, 2016.
- [2] United Nations Office for Outer Space Affairs (UNOOSA), "Space law treaties and principles." [Online]. Available: <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties.html>. [Accessed: Oct. 21, 2026].
- [3] United Nations, "Treaty on principles governing the activities of states in the exploration and use of outer space, including the Moon and other celestial bodies," *United Nations Treaty Series*, vol. 610, p. 205, 1967.

- [4] United Nations, "Agreement on the rescue of astronauts, the return of astronauts and the return of objects launched into outer space," *United Nations Treaty Series*, vol. 672, p. 119, 1968.
- [5] United Nations, "Convention on international liability for damage caused by space objects," *United Nations Treaty Series*, vol. 961, p. 187, 1972.
- [6] United Nations, "Convention on registration of objects launched into outer space," *United Nations Treaty Series*, vol. 1023, p. 15, 1975.
- [7] United Nations, "Agreement governing the activities of states on the Moon and other celestial bodies," *United Nations Treaty Series*, vol. 1363, p. 3, 1979.
- [8] F. Lyall and P. B. Larsen, *Space Law: A Treatise*, 2nd ed. Abingdon, U.K.: Routledge, 2018.
- [9] F. Duina, *Harmonizing Europe: Nation-States within the Common Market*. Albany, NY, USA: State University of New York Press, 1999.
- [10] L. Hooghe and G. Marks, *Multi-Level Governance and European Integration*. Lanham, MD, USA: Rowman & Littlefield, 2001.
- [11] African Union, *Statute of the African Space Agency*. Addis Ababa, Ethiopia: African Union, 2018.
- [12] Federal Republic of Nigeria, *National Space Research and Development Agency Act, 2010*, Act No. 9 of 2010. Nigeria, 2010.
- [13] Republic of South Africa, *Space Affairs Act 84 of 1993*, as amended. South Africa, 1993.
- [14] Republic of South Africa, *South African National Space Agency Act 36 of 2008*. South Africa, 2008.
- [15] United Nations Office for Outer Space Affairs (UNOOSA), *Compendium of Space Law*. United Nations, 2013.