

Space Governance in Africa

OSL Report
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Project OSL – Outer Space Law for International
Cooperation and Sustainable Development

SPACE GOVERNANCE IN AFRICA

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[More on the Project](#)

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LIST OF ACRONYMS

ACAO	African Civil Aviation Organisation
ACP	African, Caribbean, and Pacific countries
AEC	African Economic Community
AFC	Africa Finance Corporation
AFCAC	African Civil Aviation Commission
AfCFTA	Agreement Establishing the African Continental Free Trade Area
AfSA	African Space Agency
ALC	African Leadership Conference
ALCE	Latin American and Caribbean Space Agency
AMCOST	African Ministerial Conference on Science and Technology
APRSAF	Asian-Pacific Regional Space Agency Forum
APSCO	Asia-Pacific Space Cooperation Organisation
ARDC	Africa Regional Data Cube
ARRA	Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space
ASAL	Algerian Space Agency
ASI	Italian Space Agency
ATU	African Telecommunications Union
AU	African Union
AUC	African Union Commission
BIUST	Botswana International University of Science and Technology
BSC	Broglio Space Centre
CEN-SAD	Community of Sahel-Saharan States
CITMC	[African Union] Conference of Ministers in charge of Communication and Information technologies
CMO	Caribbean Meteorological Organisation
COMESA	Common Market for Eastern and Southern Africa
COPUOS	Committee on the Peaceful Uses of Outer Space
CRTS	[Moroccan] Royal Centre for Space Remote Sensing
CSTD	[Nigerian] Centre for Satellite Technology Development
DLP	[GMES] Digital Learning Platform
DMC	Disaster Monitoring Constellation
EAC	East African Community
ECCAS	Economic Community of Central African States

ECOWAS	Economic Community of West African States
EEAS	European External Action Service
EGNOS	European Geostationary Navigation Overlay Service
EO	Earth Observation
ESA	European Space Agency
ESSTI	Ethiopian Space Science and Technology Institute and Council
ESTRACK	European Space Agency's network of tracking stations
EU	European Union
EUMETSAT	European Organisation of Meteorological Satellites
EUSPA	European Union Agency for the Space Programme
GDP	Gross Domestic Product
GGPEN	National Space Program Management Office
GMES	Global Monitoring for Environment and Security
GNSS	Global Navigation Satellite System
HRST	[African Union] Commission for Human Resource, Science and Technology
IGAD	Intergovernmental Authority on Development
IGO	Intergovernmental Organisation
ISS	International Space Station
ITU	International Telecommunication Union
JAES	Joint Africa-Europe Strategy
JAXA	Japan Aerospace Exploration Agency
KSA	Kenya Space Agency
LIAB	Convention on International Liability for Damage Caused by Space Objects
LPA	Lagos Plan of Action
MDGs	Millennium Development Goals
MOON	Agreement Governing the Activities of States on the Moon and Other Celestial Bodies
NARSS	[Egyptian] National Authority for Remote Sensing&Space Sciences
NASA	National Aeronautics and Space Administration
NASRDA	[Nigerian] National Space Research and Development Agency
NEPAD	New Partnership for African Development
NSS	[Kenyan] National Space Secretariat
OAU	Organisation for African Unity
OST	Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies
PRC	[African Union] Permanent Representatives Committee
PSC	[African Union] Peace and Security Council

RCMRD	Regional Centre for Mapping of Resources for Development
REC	Regional Economic Community
REG	Convention on Registration of Objects Launched into Outer Space
RM	Regional Mechanisms
RSA	Rwanda Space Agency
SADC	Southern African Development Community
SANAE	South African Antarctic Expedition
SANSA	South African National Space Agency
SDGs	Sustainable Development Goals
SPREP	Secretariat of the Pacific Regional Environment Programme
SSC	Space Solutions Compendium
STADAN	Satellite Tracking and Data Acquisition Network
STC	[African Union] Specialised Technical Committees
STEM	Science, Technology, Engineering, and Mathematics
STI	Science, Technology and Innovation
STISA	Science, Technology, and Innovation Strategy for Africa
SWG	[African] Space Working Group
TT&C	Telemetry, Tracking and Command
UMA	Arab Maghreb Union
UN	United Nations
UNOOSA	UN Office for Outer Space Affairs
ZINGSA	Zimbabwe National Geospatial and Space Agency

PREMISE

Outer space has always fascinated people's minds. Space activities represent significant instruments to expand the knowledge of our universe and discover more about human beings. This aspect continues to characterize the exploration and use of outer space, coupled with an ever-increasing use of space technologies to support political, legal, and economic measures undertaken by actors of the international community.

In this context, the African continent is no exception. It is today a burgeoning actor in the international space arena. African countries are investing in, and developing, space technologies to face their current and future socio-economic challenges.

The Report "Space Governance in Africa" provides an insight into the evolutionary approach to space activities in the continent, by analysing the governance of such activities, in both its institutional and normative dimensions, as well as the importance of international and regional forms of cooperation in the conduct of space programmes.

In the light of the international and scientific cooperation between Italy and Kenya, this study is an outcome of the research project **OSL - Outer Space Law for International Cooperation and Sustainable Development**.

The OSL Project

The OSL Project is carried out since 2019 by the OSL Team within the Department of Political Sciences of Sapienza University of Rome under the Agreement concluded with the Italian Space Agency (ASI) to implement the 2015 Framework Agreement between ASI and Sapienza.

The OSL Project Team is composed of Sapienza University's researchers coordinated by Prof. Sergio Marchisio and representatives from the Kenya Space Agency (KSA) associated with the Project.

It is a project on legal research, covering three main areas: a) legal instruments of international cooperation for space activities, especially those between Italy and Kenya; b) legal and institutional aspects related to the governance of space activities in Italy and Kenya; c) the legal regime of new space activities, including small satellites and constellations of mini satellites. The Project envisages two paths of activities: on the one side, capacity-building and education; on the other side, research and dissemination.

The Project is an important tool for consolidating the relations between ASI, Sapienza University of Rome and the KSA in order to engage in a partnership in the field of legal sciences, complementing the outstanding collaborations in the engineering sector.¹

Italy and Kenya can boast longstanding cooperation in space activities, starting from the establishment of the San Marco Project Space Centre, today Broglio Space Centre (BSC), in Malindi, Kenya. The base was governed by the Exchange of Notes signed in 1964 between the Italian and the Kenyan Governments, and two following agreements concluded in 1987 and 1995 respectively. The latter provided for a final period of fifteen years, and it has been extended several times. In 2012, negotiations began for a new Treaty, finally concluded on 24 October 2016, together with its five implementing arrangements.²

Scope and Key Preliminary Concepts

The regional dimension of the Project is a core issue, as it represents the main framework for conducting research on Kenyan policies and principles on space activities. Indeed, the long-lasting bilateral relations between Italy and Kenya are to be necessarily considered in the wider context of the development of space activities in Africa and their governance.

Therefore, the Report aims to investigate the entering of African countries in the space arena and the governance structure for the development of space activities. The Report has been concluded after the participation of the Sapienza OSL Team and KSA representatives in the IAF *Global Conference on Space for Emerging Countries - GLEC 2022*, thus benefiting from its outcomes.³

Africa is facing challenges in rapidly increasing urbanization, sustainable management of the environment and natural resources, and the need to develop technical skills and capacity-building for a growing population. The last two years witnessed a general deterioration of the situation in some African regions due to

¹ It is worth mentioning the “Italy-Kenya University Nano-Satellite (IKUNS) programme”, established in September 2015 in partnership between Sapienza University of Rome and the University of Nairobi with the main goal of designing, building and launching a “student-built” Cubesat in a three-year timeline. The 1KUNS-PF satellite was launched in May 2018, followed by a second one, URSA-MAIOR, launched in June 2017 and the third of the series, the WildTrackCube-SIMBA, launched on March 2021. Starting in 2016-, Sapienza University and the University of Nairobi also established a joint Postgraduate Course in “Space Mission Design and Management”.

² *Agreement between the Government of the Republic of Kenya and the Government of the Italian Republic on the Luigi Broglio – Malindi Space Centre, Kenya, Trento, 24 October 2016.*

³ The Report of the Masterclass on Space Law and Policy and the Plenary on Space Law and Policy organised by the OSL Team within GLEC 2022 is available at <https://www.iafaastro.org/publications/iaf-global-conferences/>.

famines, natural disasters, the impact of the Covid-19 pandemic and the following economic and social crisis, as well as the threat of terrorism. Notably, the Covid-19 pandemic led to a contraction in growth of 2.1% in 2020 and an increase in the debt ratio by 10 points of GDP.⁴ As for security issues, terrorism on the continent has reached unprecedented scale, coupled with political unstable situations in some countries.⁵

The development of space capabilities finds its rationale in the benefits deriving from space applications under the economic, environmental, and social viewpoints. This has been vigorously stressed at international level, especially within the context of the Space 2030 Agenda and UNISPACE+50.⁶

In providing an analysis of the evolution in the access to space technologies and the governance of space programmes, the concept of **'space ecosystem'** is considered in the Report to identify the key actors of the African space arena, and the maturity that African countries have reached in the sector. Indeed, the maximization of the benefits deriving from space applications, especially in terms of sustainable development, requires a long-term perspective, aimed at establishing and consolidating a robust, competitive, and innovative space sector, suitable to overcome capacity constraints and bottlenecks, including the lack of awareness of the benefits of space technologies, limited financial resources and technology gaps. This perspective encompasses the crafting of a firm space ecosystem.

The space ecosystem is the result of complex interactions among various components and elements. First and foremost, its promotion depends on the interaction between *governments, industry and society*.⁷ Their continuing and efficient collaboration is essential for the ecosystem to be innovative, responsive, robust, and commercially viable. A second element is space policy and law, i.e., policy and normative instruments that States adopt to outline the main principles and plans of action and set the rules for conducting their space programmes. Another essential element is the awareness of the potential and utility of space applications.

⁴ AU, *Outlining African Priorities for 2022: the Assembly of the African Union Begins its 35th Ordinary Session*, 5 February 2022.

⁵ Coups occurred in Chad, Guinea, Mali and Sudan, sided by a power grab in Tunisia, fighting in Ethiopia and the rise of the threat from Islamist militancy; See International Crisis Group, *Eight Priorities for the African Union in 2022*, 1 February 2022.

⁶ *Transforming Our World: The 2030 Agenda for Sustainable Development*, A/RES/70/1, 21 October 2015; UNISPACE+50, Vienna, Austria, 18-21 June 2018.

⁷ UNOOSA, *Space Economy Initiative. 2020 Outcome Report*, January 2021; The Hill, *The Future Depends on the Global Space Ecosystem*, 25 February 2021.

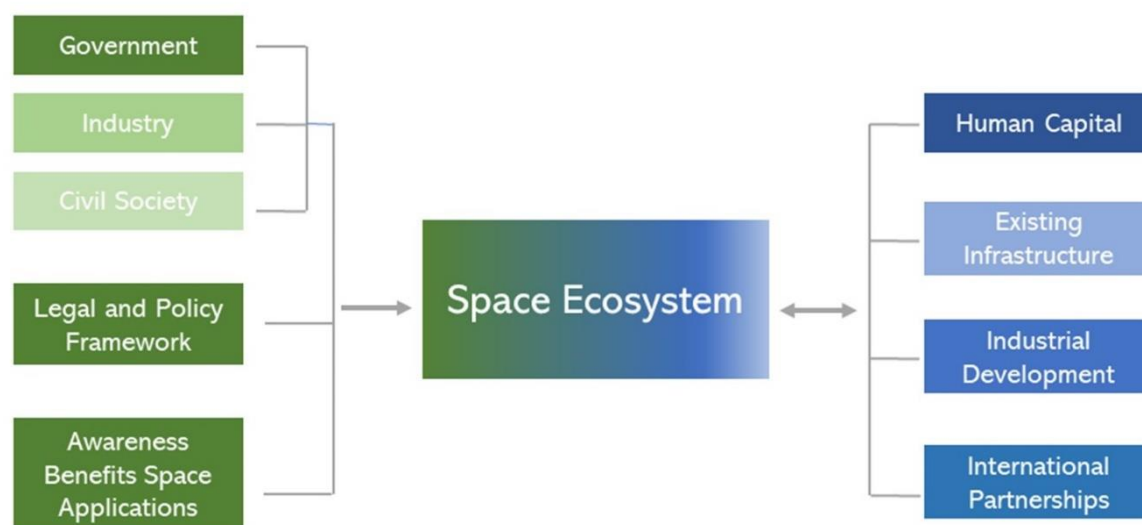


FIG. 1 The Space Ecosystem

The shape of any space ecosystem is influenced by endogenous factors, such as the human capital – which may be enhanced through capacity-building initiatives – existing infrastructures and industrial development, as well as international partnerships.

Space ecosystems are currently developed on multiple layers. States undertaking space activities put efforts in building national ones, by engaging in space endeavours, and establishing appropriate governance. The interactions among national space ecosystems in a given region create a regional space ecosystem, also involving the efforts of international organisations, such as the European Union (EU) and the AU. Finally, in the international space ecosystem, States and international organisations interact and operate in the framework provided by international space law and with the major involvement of the UN.

Such a multi-layered scenario also characterizes **space governance** in Africa. On this basis, the Report aims to provide an analysis of African space governance, which refers to the whole of organizations, institutions, political instruments, mechanisms, legal rules and procedures that govern space activities. This is analysed in its international, regional, and national dimensions.⁸ The Report distinguishes between institutional and normative governance. *Institutional governance* refers to the institutional framework capable of applying, revising if necessary, adapting the rules, and monitoring their compliance. While

⁸ MARCHISIO S., *Setting the Scene: Space Law and Governance*, in *Ordine internazionale e diritti umani, Gli Speciali*, 2018, pp. 55-65.

normative governance consists in the adoption of legal rules that address actors' behaviours in outer space.⁹ This may result in the adoption of policies and strategies, or in more comprehensive frameworks on legal substantive perspectives.

Methodology

The Report is the result of research on the main features of the development and expansion of space activities in Africa and the establishment of their governance. The investigation has required a prior assessment of the existing documentation to identify any possible knowledge gap. In this sense, the Report is the result of the comparison, analysis and processing of different data, documents and information produced at all levels with regard to African space governance.

Accordingly, the analysis follows a top-down approach, by dealing with the addressed issues first at a general level and then by focusing on specific cases. The drafting of the Report has been guided by the identification of key concepts, namely those of space ecosystem and space governance, in its institutional and normative dimensions, and by considering the regional, sub-regional and national levels. These have also been the two main topics around which the argumentations have been systematized.

Structure

Against this background, the Report is divided into **six sections**.

Section one provides an overview of the origins and evolution of the space sector in African countries by highlighting the main elements of the path toward the establishment of national space ecosystems. In this light, also the social and economic aspects of space activities in Africa are addressed. Finally, particular attention is devoted to the features of the interaction between the governments and the private sector in shaping the African space ecosystem.

Section two introduces the evolution of space governance in Africa. It highlights the need for coordination and synergy that, starting from sub-regional forms of cooperation, has brought the AU to engage in space activities. In order to frame the context in which these are governed at the continental level, the section also provides an overview of the path of regional integration in the continent, starting from the creation of the Organization for African Unity (OAU) to the current institutional framework at the regional and sub-regional levels.

⁹ *Ibidem*.

Section three outlines the policy objectives of the African space programme. It identifies the connections between space activities and sustainable development objectives that led the AU to include outer space among the Flagship Projects of the Agenda 2063,¹⁰ and provides an analysis of the context and content of the *African Space Policy and Strategy*,¹¹ i.e., the most relevant policy document adopted by the AU in the field of space activities.

Section four introduces a further element of the institutional space governance at the regional level by retracing the origins and establishment of the African Space Agency (AfSA). Furthermore, it analyses the objectives set forth in the AfSA Statute, the role of the Agency in promoting and coordinating the implementation of the *African Space Policy and Strategy*, and provides a state-of-the-art of the implementation of the AfSA Statute.

Section five moves from the regional to the national dimension of the governance of space activities by introducing a breakdown of African countries based on the approach to their regulation. The normative governance of space activities at the national level is diversified, ranging from the adoption of space policies and strategies, the establishment of national space agencies or Centres in order to support the development of the respective space programmes, to the adoption of rules on specific activities (e.g., remote sensing) or more detailed space legislation.

Section six is devoted to existing forms of space cooperation between Europe and Africa, with a particular focus on Italy-Kenya cooperation in view of the framework in which the Report has been drafted. In this light, the Report clearly highlights that space activities conducted by African countries have always been characterized by a marked international character, viewing African countries as becoming partners of spacefaring nations in cooperative endeavours.

¹⁰ AU Assembly, *Agenda 2063. The Africa We Want*, Assembly/AU/Dec.476(XXI), 27 May 2013, Addis Ababa, Ethiopia.

¹¹ AU Assembly, *African Space Policy. Towards Social, Political and Economic Integration*, 2016; AU Assembly, *African Space Strategy. Towards Social, Political and Economic Integration*, 2016.

1. EXPLORING THE AFRICAN SPACE SECTOR

This section highlights the development of the African space landscape. The entry of African countries in the 'space arena' and the awareness of the benefit of space activities for the continent favored the establishment of space ecosystems, built on the interactions among governments, industry, and society. The section emphasizes the evolving attitude of States to space activities on the continent, while registering distinct levels of technological capability and regulations.

The African Space Landscape

Origin, Evolution and Perspectives

The current African space landscape is the result of decades of development that has evolved from bilateral and multilateral programmes to countries' autonomous space capabilities. The involvement of the African countries in the space arena has gradually increased over the years and achievements have been acknowledged in several countries across the continent. Algeria, Egypt, Nigeria, Kenya, and South Africa are among the countries most engaged in space activities, while other countries are improving their commitment in the space sector, such as Angola, Ethiopia, Tunisia, Morocco, and Ghana.¹² Notwithstanding this general trend in the region, the scenario is **highly diversified** as it is called to respond to different challenges at the domestic level.

As any **space ecosystems**, the African ones are shaped according to the legal, economic, and social condition of any concerned country, so that the outcomes in terms of the ecosystem's characteristics depend on these variables. This panorama is also multi-layered, encompassing initiatives of single countries as well as those of the African Union.

The creation of space ecosystems in Africa is a fairly recent development, but space activities have been carried out from African territory since the middle of the XX century.

¹² FROELICH A., *Space Supporting Africa*, Vol. I, Cham, 2019, pp. 267-270.

In the early Sixties, Italy agreed with Kenya to establish a launch and tracking facility, the San Marco-Malindi base. Between 1967 and 1988, several launches of Italian and foreign satellites were performed therefrom, including the NASA Uhuru satellite in 1970. Today, the facility still reliably provides ground services given its privileged location (see *infra*).¹³

Space activities involving African countries have been shaped by a marked **international character** for decades, during which African countries have become partners of spacefaring nations in cooperative endeavours. In those years, Africa remained a consumer more than a producer of space services. Indeed, EO, positioning and other data provided by space applications have been for long out of reach for a number of African countries. Such technologies were considered too expensive, and consequently, few African nations invested in space programmes.

A marked shift took place in the 1990s, when African countries started to carry out space activities developing and building their own satellites,¹⁴ mainly devoted to telecommunications and EO, perceived as tools to overcome challenges affecting country development, such as providing connections and monitoring natural resources. The first African satellite, the Egyptian Nilesat 101, launched in 1998 from Kourou (French Guiana) on board an Ariane 4 rocket, was a telecommunications satellite. EO was instead the purpose of the second African satellite, the SunSat-1, developed by South Africa and launched aboard a Delta II rocket from Vandenberg Air Base in 1999.

Since the turn of the Millennium, space activities have spread across the continent and specific issues have brought to the forefront the need for **proactive capacity development** in the use of space applications.

Tipping Points for the Development of African Indigenous Space Capabilities

The path towards the building of national space ecosystems in Africa has been marked by a shift in the attitude of African countries *vis à vis* space activities. Indeed, the building of national space ecosystems in Africa has been strictly

¹³ FERRAJOLO O., *Launch and Tracking Stations: the San Marco Malindi Case*, in LAFFERRANDERIE G., CROWTHER D. (eds.), *Outlook on Space Law over the Next 30 Years*, The Hague-London-Boston, 1997, pp. 273-284, particularly p. 277.

¹⁴ In 2022, the nanosatellite constellation MDASat from South Africa was put in orbit. It consists of three satellites entirely developed and designed in Africa for collecting data aimed at improving the security and protection of South African marine resources. See ROYI N., *Nanosatellite Launch is a Big Step Forward for African Space Science*, in *The Conversation*, January 2022.

linked to the emerging awareness of the necessity to increase capacities in becoming **autonomous space players** and reduce their reliance on foreign space services. Such awareness-rising has been a tipping point from which the African journey to space took off and is clearly expressed in the commitment of the African Union, arguing that:

“Africa cannot afford to remain a net importer of space technologies, as in the long term this will limit socio-economic development and negate the African Union vision of an integrated, prosperous and peaceful Africa, driven by its own citizens and representing a dynamic force in the global arena.”¹⁵

From the early 2000s, **technological evolution** has also played a key role in overcoming bottlenecks for the development of space projects, such as budget constraints and lack of technical capabilities. Developments in satellite building allowed a **decrease in the cost** of manufacturing of these assets. Satellites became smaller and cheaper with less complex characteristics. This constituted a turning point in the spread of space activities across the African continent, from a twofold perspective.¹⁶ First, the affordable costs for the development of space projects increased the opportunity to carry out these activities by a growing number of countries. Second, the lower level of complexity in building small satellites components favored the involvement of universities in such projects.

The **participation of academia** in the development of national space sectors represents a paramount shift. Universities and research institutes still play a pivotal role in this regard. As of today, 28 of the 54 African countries have been engaged in the EO and Geo-Information Sciences through 90 academic institutions, 17 national scientific associations, 21 national space entities, 10 satellite receiving and tracking stations and a few regional technical laboratories.¹⁷ Generally, much of the capacity-building had been performed at regional centres,¹⁸ or abroad, by way of training professionals, mainly from public departments or universities. Today African universities contribute to societal

¹⁵ AU Assembly, *African Space Strategy*, cit., p. 6.

¹⁶ ACEVEDO R., BECERRA R., *Small Satellites as a Chance for Developing Countries*, in MARBOE I. (ed.), *Small Satellites- Regulatory Challenges and Chances*, Leiden-Boston, 2016, p. 106.

¹⁷ WOLDAI T., *The Status of Earth Observation (EO) & Geo-Information Sciences in Africa – Trends and Challenges*, in Geo-spatial Information Science, 2020. Space in Africa, *List of Space Agencies in Africa*, 25 July 2022, <https://africanews.space/list-of-space-agencies-in-africa/>

¹⁸ These include *inter alia*, AFRIGIST formerly RECTAS in Nigeria, the former Regional Remote Sensing Centre in Ouagadougou, Burkina Faso, and the Regional Centre for Mapping of Resources for Development (RCMRD) in Kenya.

capacity by functioning as nodes in a global network of knowledge, providing geomatic, remote sensing and geoinformation science education and training.¹⁹

This involvement of academia, coupled with the advent of **small satellites technologies** and the better knowledge of the benefits deriving from space activities, has resulted in the launch of 50 satellites by 15 countries as of 2022, including Egypt, South Africa, Algeria, Nigeria, Kenya, and Morocco. In addition, it is expected that at least 23 African countries will have launched one satellite by 2025, with a total of 125 satellites in orbit.²⁰ So far, 30 out of the 48 African objects are small satellites,²¹ that have been deemed as a cost-effective option to offer innovative solutions for monitoring and managing natural resources, enhancing sustainable urban and territorial development initiatives, and facilitating the conservation of forests and valuable biodiversity habitats.

The launch of national objects is just of the activities characterizing the African space landscape. Indeed, African countries also engaged in the establishment of **ground space infrastructure**, such as tracking stations and antennas, and of regional centres devoted to remote sensing.²²

The African Space Economy

A Glance

Following the increasing interest of African countries in space endeavours, the African space economy has experienced a **rapid growth** in the last decade. Along with the commitment of governments and public agencies, private companies have become a major component of the African space landscape, consistently with the global trend in the field.

¹⁹ While 11% of the universities and colleges are known to offer three to seven days GIS courses to undergraduates, around 23% have degrees and research programmes leading to BSc, MSc, and PhDs.

²⁰ Space in Africa, *African Space Industry Revenue to Surpass USD 10.24 billion by 2024 Despite Covid-19 Setback*, 6 July 2021; ADETOLA A. *Egypt Launches Nilesat 301 Aboard SpaceX' Falcon 9*, in Space in Africa, 8 June 2022: "This brings Egypt's total launched satellites to ten, and Africa's satellite fleet to 48"; Spacewatch Africa, *Zimbabwe and Uganda to Launch their First Satellites, 20 October 2022*.

²¹ IDERAWUMI M., *Why Small Satellite Constellations are the Next Revolution for Africa*, in Space in Africa, 30 May 2022.

²² These include the Regional Centre for Remote Sensing of North Africa States in Tunis, Tunisia, Regional Centre for Mapping of Resources for Development in Nairobi, Kenya, the AGRHYMET Regional Centre in Niamey, Niger and the Southern African Development Community Regional Remote Sensing Unit in Gaborone, Botswana.

In **2022**, global space economy reached **USD 424 billion**. The space economy is expected to **grow by 74% by 2030 to reach USD 642 billion** renewing its strong growth pattern following a 4% decrease in 2020 under the effect of the Covid crisis impact on commercial space services.²³

The African space sector is estimated to be over USD 7 billion and projected to exceed 10 billion by 2024.²⁴ In 2022 alone, Africa's space budget was USD 534.9 million. This represents a 2.4% increase from 2021 and nearly twice (94% of) the 2018 budget.²⁵ The growth of the satellite market is the outcome of the development of several national space programmes in conjunction with the expansion of the commercialization of space activities. These are now considered as significant tools for fostering sustainable development in the region.

Space economies in several African countries are focused on **downstream applications**, particularly satellite communications and television services (around 75% of current space economy revenue). These are focused on meeting the demands of the market in terms of telecommunication, environment, education, health, security and more. Nonetheless, with new research and innovation in the value chain, the regional landscape is shifting and there is an emerging trend of investments in upstream activities, including Global Navigation Satellite Systems (GNSS) and EO, for both well-established African space economies and countries looking to scale up their sectors.²⁶ The overall sector is continuously expanding and fulfilling Africa's potential in a fast-growing segment that can make a vital contribution in addressing the continent's challenges.

In terms of **human capital** and **job creation**, about 8.500 people work across the African space industry, 2.000 are employed in commercial companies and at least 6.500 in public national space programmes and research centres.²⁷ The African space industry value chain is growing rapidly and there are currently around 283 private and public companies, based in 31 different African countries, active in both the upstream and downstream segments.²⁸ Some are spinoffs of universities and research institutions, or government-owned companies, while others are privately-owned businesses. Furthermore, new space companies,

²³ Euroconsult, *Space Economy Report 2022*, December 2022.

²⁴ UNOOSA, *Space Economy: Africa in Focus*, Online Event, 30 June 2021.

²⁵ Space in Africa, *African Space and Satellite Industry Now Valued at USD 19.49 Billion*, 17 August 2022.

²⁶ UNOOSA, *Space Economy Initiative 2020. Outcome Report*, cit., p. 6.

²⁷ Space in Africa, *African Space Industry Annual Report*, 2019.

²⁸ Space in Africa, *NewSpace Africa Industry Report*, 2021.

such as CubeSpace, Eurêka Géo, SCS Space (Pty) Ltd, StratoSat DataCom support the rapid development of African space activities through targeted investments in ground and space infrastructures, especially with the development of small satellites.

The economic growth of the African space market depends also on the **start-ups** which represent essential tools to create a viable space market that serves user needs with varied technologies and products. Start-ups in the continent have recently attracted over USD 200 million in investment from local institutions (governments, universities, and space agencies) and international investors. A database of African start-ups has been created - *Digest Africa* - listing companies that are exploiting space technologies in key vertical sectors including agriculture, healthcare, transportation, and financial technology. The rise of start-ups ensures the development of indigenous space capabilities and establishes community sharing of experiences and best practices. For instance, the programme “GMES and Africa” (see *infra*) provides 20% of grants to the private sector, mostly to start-ups. This is particularly beneficial for the youth generation in terms of access to capacity-building, skills acquisitions, and employment.

Space activities have always been **capital-intensive** and relatively associated with a **high level of risk**, especially in the development phase. While governments continue to play a dominant role in the space domain, the **private sector** is now an integral part of the development and realisation of space activities, providing contractors, research and development, equipment, components, and services. A key driver for these developments has been the emergence of new **business models** in the space sector, inspired by assembly line manufacturing and the digital transformation, accompanied by a greater role of intangible assets (e.g., software, data) *vis à vis* physical assets. Examples in the space sector include not only the growing number of operators using low-cost CubeSats, but also start-ups in space situational awareness and ground operations, which develop low-cost and low-maintenance ground equipment combined with user-friendly software solutions. In Africa, commercial ventures are developing space technologies, and offering space-enabled services to address market demands in various sectors, including telecommunications, defence, security, maritime, aviation, mining, agriculture, environment, development, education, and health.

Private sector-driven space activities are concentrated primarily in **South Africa**, but there are also in **Nigeria, Mauritius, Egypt, Kenya**, and **Sudan**. The involved companies, through their accomplishments in research, innovation, and commercial interactions, have gained traction in the form of partnerships and capital investments and have made significant contributions to the continent's

development by offering solutions to security, education, environmental, and agricultural issues using satellites.

Interactions Among Governments and the Private Sector

The current level of involvement of private companies in space activities in Africa implies the need for an enabling environment to ensure the development of a mature **space industry**, as interactions among the government and the private sectors shape the establishment and consolidation of space ecosystems. In addition to government-owned and government-operated space programmes, private entities are becoming important actors in the African space sector. Adequate legislation, funding, regional and international partnerships are essential tools in order to create a stimulating environment for private sector participation.

The development of a sustainable and vibrant **indigenous space industry** that promotes and responds to the needs of the African continent is among the objectives set by the AU in the *African Space Policy and Strategy*,²⁹ adopted in January 2016 by the AU Heads of State and Government Assembly with the aim of developing local capacities in EO, satellite communications, navigation and positioning, space sciences, and astronomy, in accordance with the *Agenda 2063* (see *infra*). Accordingly, the development of indigenous capacity and capabilities will enable research, development, and innovation within the African space sector. As long as space science and technology remain a fledgling sector on the continent, research, innovation, and knowledge production should play a key part in industrial growth and in ensuring a financial and/or social return. These are expected to provide opportunities for the scientific and engineering space workforce to internalise the present intellectual capital and excel within the development of next-generation technology platforms, products, and services. In this sense, one of the key objectives highlighted in the *African Space Strategy* is the development of the needed **human capital** through existing institutions and infrastructure.

The creation of a **firm African space market** at national and regional levels is deemed as a must-have tool for strengthening African engagement in the global space arena and maximising the benefit coming from space applications. Indeed, one of the key targets for African countries involved in space activities is stimulating the space market and entrepreneurial network through an appropriate legal and regulatory framework. The AU has acknowledged this need in the *African Space Policy and Strategy* and fostered the establishment of **public-**

²⁹ AU Assembly, *African Space Policy*, *cit.*; AU Assembly, *African Space Strategy*, *cit.*

private partnerships to promote the development of the continent's space infrastructure, particularly through the integration of space technology into other sectors of the economy establishing an integrated network linking national, regional, and continental institutions.

Private sector participation is also impacted by the **regulatory framework** of space activities adopted at the **national level**. As an example, the National Space Research and Development Agency (NASRDA) Act, adopted by Nigeria in 2010, encompasses the implementation of “strategies for promoting private sector participation in the space industry” among the functions of the Agency enumerated in Section 6(e). The Act also provides a platform for the private operations in Section 9, referring to NASRDA power to grant licences to body corporates.³⁰ **National space legislation** across Africa has addressed the involvement of the private sector through appropriate regulation in various ways, including licensing systems, regulating public-private partnerships and fundraising (see *infra*).

As access to outer space depends on access to capital, **fundraising** is a crucial issue in the relationship between governments and private entities in the African space market. As of 2022, the panorama is composed of around 280 private and public companies that are managing to attract investors due to their prospect of potential growth.³¹ Some companies are government-owned while others are spin-offs of university incubation programmes. Public investments represent the bulk of funding in the sector, especially for government-owned space projects realized through space agencies and institutions. Sources for financing space activities come also from foreign governments through research and development international partnerships involving institutions and space agencies. In addition, development banks in Africa provide debt financing for commercial space projects. For instance, the African Development Bank has so far provided financing for various multilateral commercial satellite projects, and national banks and governments are sometimes major investors in private company-led initiatives.³² As a result, there has been a steady rise in the involvement of

³⁰ FALETI J., *Impact of Regulations on Private Sector Participation in the Nigerian Space Industry*, in Space in Africa, 3 November 2020.

³¹ ASUNLOYE A., *Accessing AFC's USD 2 Billion Facility Fund for Space Projects*, *supra* note 25.

³² For example, the African Development Bank provided debt financing for various multilateral commercial satellite projects in Africa, including a USD 50 million loan for RasComStar in 2007, a USD 25 million loan for the New Dawn Satellite Project in 2009 (now wholly owned by Intelsat), and a USD 50 million loan for the Other 3 billion (O3b) project in 2010 (wholly owned by SES SA). The Development Bank of Southern Africa (DBSA) is also one of the major investors in the O3b project. The DBSA provided a total facility of USD 76 million (USD 40 million debt and USD 36 million equity financing) to O3b Networks. The Government of Rwanda was also one of the institutions that led OneWeb's largest fundraising to date, USD 1.25 billion, bringing the total funds raised by the company to USD 3.4 billion.

international and African financial institutions directed to the financing of space activities. Another funding opportunity that would involve the African space sector is the initiative launched by the Africa Finance Corporation (AFC), which has announced a USD 2 billion facility fund to help economic recovery and resilience in Africa.³³

Final Remarks

The creation of space ecosystems in Africa is a fairly recent phenomenon. The current African space landscape is the result of decades of development and international cooperation that has evolved to include regional and national space initiatives.

Technological evolution played a key role and constituted a turning point in the development of space activities on the African continent. The decrease in costs related to space projects has allowed an increasing number of governments and public institutions to allocate budget for the development of these activities. Such development has favored the establishment of space ecosystems, built on the interactions among governments, industry, and society.

The path towards building national space ecosystems in Africa has also been marked by a change in the attitude of countries towards space activities, based on the awareness of the need to increase their technological capabilities and become autonomous space actors to reduce their reliance on foreign space services.

The interest of African countries in space activities has fostered the development of the space economy on the continent, which experienced a constant growth over the last decade. In line with the global trend in this sector, governments still play a prominent role in the space domain, but private entities are becoming important players in the sector. Appropriate legislation, funding of space programmes, regional and international partnerships are essential tools to consolidate the current landscape of the African space sector and to ensure the development of a mature space industry.

³³ ASUNLOYE A., *Assessing AFC's USD 2 Billion Facility Fund for Space Projects*, Space in Africa, 24 May 2022..

2. INTRODUCTION TO THE GOVERNANCE OF SPACE ACTIVITIES IN AFRICA

The establishment of a governance framework at the national, sub-regional and regional levels has accompanied and promoted the development of space activities in Africa. This section highlights how the need for coordination and cooperation in the sector, starting from sub-regional forms of cooperation, has brought the AU to engage in space activities. In order to frame the context in which these activities are governed at the regional level, the section also provides an overview of the path of regional integration in the continent, starting from the creation of the Organization of African Unity (OAU) to the current institutional framework at regional and sub-regional levels.

Coordination and Synergy: from the ALC Conferences to the AU First Efforts in the Space Domain

The governance of space activities in Africa needs to be analysed in its regional (or continental), sub-regional and national dimensions. Starting from the regional dimension, developing an adequate regional space capability requires both a governance structure to advance the African collective effort and proper financing, due to the capital-intensive nature of the space sector.³⁴

Before coming up with the formulation of a continental space programme, and establishing a space policy and strategy, the African space landscape has been long characterised by the development of a number of **separate initiatives with a sub-regional dimension**.

The first attempt to bring all these initiatives together to create synergised and complementary programmes dates to the establishment of the African Leadership Conference on Space Science and Technology for Sustainable Development (**ALC Conference**) in 2005. This represented the first regional initiative in which some African countries began to consider the opportunity to

³⁴ AU Assembly, *African Space Strategy*, cit., p. 5.

undertake collective efforts in the space sector.³⁵ They believed that such a form of cooperation would allow them to attain two main objectives. On the one hand, it would have fostered collective actions towards Africa's development, and eventually enabled the continent to be a global space player. On the other hand, this would have made available to all African countries the benefits of space science and technology. Furthermore, a continental approach to the development of space activities was considered instrumental to make the African governments and decision-makers appreciate the key role of space technology in achieving development goals.

In 2005, during the 48th session of the COPUOS, Nigerian delegation proposed the establishment of the ALC Conference as a way for addressing such needs. Indeed, despite the strong development focus of the two main continental political structures, namely the AU, established in 2002, and the New Partnership for African Development (NEPAD) created in 2001, outer space did not feature in the development agenda of either.³⁶

The ALC Conference had three **main objectives**: 1) raising awareness among African leaders of the importance of space science and technology; 2) providing a regular forum for the exchange of information among African countries about their space activities; 3) enhancing intra-African cooperation in the development and applications of space technology.

From a temporal perspective, the ALC Conference takes place every two years. The first editions were held in Nigeria (2005), South Africa (2007), Algeria (2009) and Kenya (2011).

The 4th ALC Conference, held in Mombasa, Kenya, from 26 to 28 September 2011, was of particular importance as it brought significant novelties compared to previous editions. First, the Conference featured the participation of a considerable number of non-Africans, indicating the growing interest of the international space community in the emerging space arena in the continent.³⁷ Furthermore, unlike the previous ALC sessions, where the focus was on a review of national space activities, in that session the emphasis was on the discussion of several topics related to the theme of the Conference "Building a Shared Vision

³⁵ Representatives from Algeria, South Africa, Kenya, Egypt, Ghana, Republic of Benin, Nigeria, Chad Republic, Niger, Democratic Republic of Congo, Uganda, Angola, Gambia, Eritrea, Sierra Leone, Ethiopia, Morocco, and Libya participated in the Conference.

³⁶ MARTINEZ P., *The African Leadership Conference on Space Science and Technology for Sustainable Development*, in *Space Policy*, 28, 2012, pp. 33-37.

³⁷ The Conference was attended by 118 participants from 10 African countries and 46 participants from 10 other countries outside Africa.

for Space in Africa”. A panel, in particular, considered such an issue, and the main results were included in the ***Mombasa Declaration on Space for Africa’s Development***.³⁸ Remarkably, this was the first ALC Conference to produce such a Declaration, by which Africa’s space leaders committed to taking concrete and collective actions to address a number of needs and challenges in several areas, through the support of space technologies.

The following editions of the ALC Conference have been organised in Ghana, (2013), Egypt (2015), Nigeria (2018) and Ethiopia (2019). During the latter, the States decided to change its denomination in “African Space Leadership Congress” (ALSC).

The participation in the Conference has grown throughout the years, moving from the attendance of representatives from 17 African countries in 2005 to over 200 participants from 31 countries, 21 of which were African countries, in the last session of 2019.

Over the years, the importance of the space sector and the need to cooperate and work towards the same direction has led the **African Union** to enter as one of the main actors in the African space landscape. This can be considered a turning point in the evolution of the governance framework for the development of space activities at the continental level. Along this line, given the fundamental role recognized to space capabilities in achieving development goals (see *infra*) and the importance of collective efforts in the field, the AU acknowledged such need and promoted a continental approach to space activities. The AU involvement commenced in March 2010, when at the 4th African Ministerial Conference on Science and Technology (AMCOST IV), Ministries recommended the setting-up of a Space Working Group (SWG) to develop a draft African Space Policy and Strategy.³⁹

Before analysing these documents, the next paragraph introduces the AU institutional governance in order to frame the context in which space activities are governed at the continental level.

³⁸ *Mombasa Declaration on Space for Africa’s Development*, adopted by the 4th African Leadership Conference on Space Science and Technology for Sustainable Development, 28 September 2011.

³⁹ See Section 3.

From the Organisation of African Unity to the African Union

Background

Today, there are more **regional organisations** in Africa than in any other continent, and most African countries are members of more than one regional integration initiative.⁴⁰

This trend dates to the **decolonisation period** (mid-to-late 1950s to 1975), when Africa experienced the establishment of an entire range of regional schemes for political and economic cooperation. Both practical and political reasons laid at the basis of the creation of such schemes. From a practical viewpoint, without the binding structures of the colonial administrations, Africa's newly independent States quickly faced economic and political divisions and felt the need to face the ongoing exploitation of the continent's resources through regional cooperation. Secondly, Pan-Africanism emerged as the main aspiration that, ever since the first Pan-African Congress in 1900, advocated African integration and unity as the only means of bringing about true self-rule and self-determination on the continent. Accordingly, besides the proliferation of intergovernmental organisations, federations, unions, and communities during Africa's decolonisation period, the broader aspiration of continental integration spread all along the continent.⁴¹

Against this background, regional integration in Africa is a path to be analysed by taking into account the running in parallel of two processes toward integration: a) at the continental level, with the establishment of the OAU first, and the AU then, and; b) at a sub-regional level.

As for integration at the **continental level**, the most visible aspect of regionalisation in the 1960s was the attempt to create an African supranational institution that could bring together the independent African States under a continent-wide umbrella. Not everyone agreed on how this unity could be

⁴⁰ DINKA T., KENNES W., *Africa's Regional Integration Arrangements. History and Challenges*, European Centre for Development Policy Management, Discussion Paper No. 74, September 2007.

⁴¹ See FRANKE B.F., *Competing Regionalisms in Africa and the Continent's Emerging Security Architecture*, in *African Studies Quarterly*, 2007; MARCHISIO S., *International Law*, Torino, 2021, p.11.

achieved⁴² but, finally, the **Organisation of African Unity** was established on 25 May **1963** in Addis Ababa, Ethiopia, by 32 African States.⁴³ A further 21 members joined OAU gradually, reaching a total of 53 by the time of the African Union's launch in 2002.⁴⁴ OAU represented Africa's first continent-wide organisation of independent States.

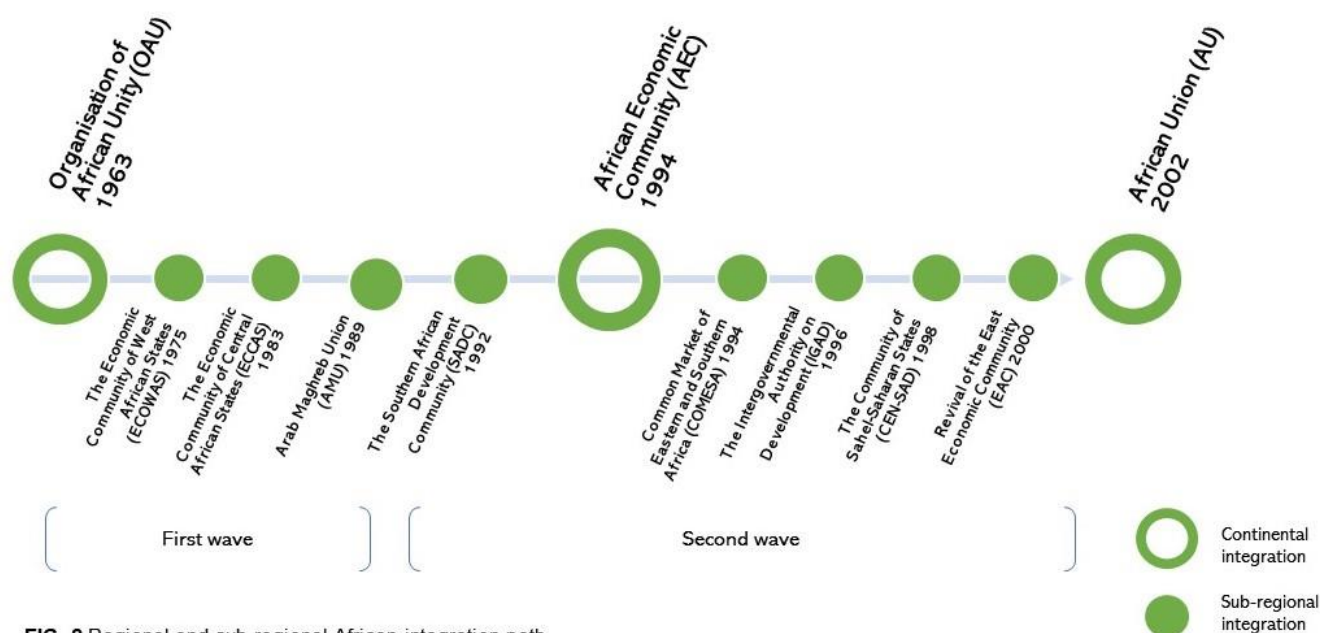


FIG. 2 Regional and sub-regional African integration path

The OAU was not conceived to be the only international organisation on the continent. After its establishment, there have been the creation of **many regional organisations in Africa**, most of whom are still active. Indeed, although the main purpose of the OAU was to coordinate the continent's cooperative activities and to ensure their compatibility and unity of effort (Article II, OAU Charter), the same Charter did not contain any specific provision clarifying the continental hierarchy of institutions and organisations. Furthermore, although Article XX of the Charter had established some specialised commissions (including Economic and Social;

⁴² In this period, two groups of States emerged in this respect: the Casablanca bloc, which comprised Ghana, Algeria, Guinea, Morocco, Egypt, Mali and Libya and pledged for a Federation of all African countries; the Monrovia bloc, composed of Senegal, Nigeria, Liberia, Ethiopia, and most of the former French colonies, which felt that unity should be achieved gradually, through economic cooperation and did not support the establishment of a political federation.

⁴³ *Charter of the Organization of African Unity*, Addis Ababa, Ethiopia, 25 May 1963, Article IV.

⁴⁴ FRANKE B.F., *Competing Regionalisms in Africa and the Continent's Emerging Security Architecture*, *supra* note 41; DINKA T., KENNES W., *Africa's Regional Integration Arrangements. History and Challenges*, *cit.*

Educational, Scientific, Cultural and Health; and Defence), these never really materialised, so that States began to fill the continental gap in specific fields of action by expanding and intensifying sub-regional cooperation.⁴⁵

This especially occurred during two temporal waves. The **first wave** took place from the mid-1970s to the early 1980s. The reasons behind it were related to the deliberate post-independence pursuit of integration by African policymakers, but it could also be seen, to some extent, as a response to the perceived success of the European Community and its first enlargement in the 1970s. The **second wave**, which took place during the first half of the 1990s, was more focused on revitalising and expanding the mandates of existing regional bodies rather than on creating brand new groupings.⁴⁶

The Lagos Plan of Action and the African Economic Integration

Between the mentioned first and the second wave, a significant boost to continental integration took place and this had consequences on the development of regional and sub-regional organisations too. Notably, during the 2nd Extraordinary Session of the OAU Heads of State and Government devoted to Africa's economic problems, held in Lagos, Nigeria, in 1980, the Parties adopted the Lagos Plan of Action (LPA) and the Final Plan of Lagos. Both the Plans aimed to undertake measures for the restructuring of the economic base of the African continent, by adopting a far-reaching regional approach based, primarily, on collective self-reliance. The Final Plan, especially, called for the drafting of a Treaty to eventually establish an African Common Market by the year 2000 as a first step towards the creation of an African Economic Community.⁴⁷

In 1991 this idea became the central feature of the **Abuja Treaty** establishing the **African Economic Community (AEC)**, which was conceived as an organic structure for economic integration and constituting an integral part of the OAU. The institutions or organs of the OAU were co-opted to perform the functions of

⁴⁵ *Ibidem.*

⁴⁶ *Ibidem.*

⁴⁷ OAU, *Lagos Plan of Action for the Economic Development of Africa 1980-2000*, Lagos, Nigeria, 1980, Annex I.

the institutions established by the AEC Treaty.⁴⁸ The Treaty entered into force in 1994.⁴⁹

The African Union

The establishment of the African Union (AU) in 2002 provided for a reinforcement of the Pan-African ideal. The **Constitutive Act of the African Union** was adopted on 12 July 2000 in Lomé, Togo, by the OAU/AEC Assembly of Heads of State and Government and was officially launched in July 2002 in Durban, South Africa, as a new continental organisation to build on the work of the OAU. A considerable number of OAU structures have been carried forward into the AU and its Constitutive Act have fully incorporated the provisions of the Abuja Treaty, although AU's competencies have been significantly broadened, particularly in the areas of peace and security and good governance.⁵⁰

The **AU** fits into the traditional model of **regional international organisations**, of which the OAU was a typical example as well. Nevertheless, the aspiration, clearly reflected in the Constitutive Act, is to become an organisation of economic and political integration.⁵¹

The **Constitutive Act** is an international agreement defining the statute of the new international organisation. Looking at its content, it constitutes a “framework constitution” characterised by a series of references to already in force international agreements or to supplementary protocols (essential for completing the institutional architecture of the new organisation) concluded in the transitional phase from the OAU to the AU or immediately thereafter.⁵²

⁴⁸ *Treaty Establishing the African Economic Community*, Abuja, 3 June 1991, Preamble and Article 1; OPPONG, R.F., *The African Union, the African Economic Community and Africa's Regional Economic Communities: Untangling a Complex Web*, in *African Journal of International and Comparative Law*, 2010, pp. 92-103.

⁴⁹ The Agreement Establishing the African Continental Free Trade Area (AfCFTA) was concluded in Kigali on 21 March 2018 and came into full effect on 30 May 2019. Trade commenced on 1 January 2021. As of April 2022, it has been signed by 54 AU Member States and has been ratified by 28 countries.

⁵⁰ This is reflected in the establishment of the Peace and Security Council (PSC) and the African Peer Review Mechanism, i.e., a voluntary mechanism for mutual monitoring of governance and accountability.

⁵¹ CADIN R., *Origine ed evoluzione del sistema di sicurezza collettiva dell'Unione africana*, in *Federalismi*, n. 6, 2010. On the features of international organizations see MARCHISIO S., *L'ONU. Il diritto delle Nazioni Unite*², Bologna, 2012, pp. 21-24.

⁵² *Ibidem*.

Institutional Framework

The AU Constitutive Act (Article 5) provides for the establishment of a number of **organs**, namely the Assembly, the Executive Council, the Permanent Representatives Committee, the Specialised Technical Committees, the Peace and Security Council, the AU Commission, the Pan-African Parliament, the Court of Justice, the Economic, Social and Cultural Council, and financial institutions, and several technical and subsidiary committees that have been newly established in the passage from the OAU to the AU.⁵³



FIG. 3 Main organs of the African Union

⁵³ *Ibidem.*

Among them, the five key decision-making and policy organs are the following:

The AU's supreme policy and decision-making organ is the **Assembly of Heads of State and Government**, which comprises all the 55 Member States. It defines the AU's policies, establishes its priorities, adopts its annual programme, and monitors the implementation of its policies and decisions.⁵⁴

The **Executive Council** is composed of foreign affairs ministers, or such other ministers or authorities designated by the governments of the Member States and coordinates and takes decisions on policies in areas of common interest to the Member States. Among these, the AU Constitutive Act includes "science and technology" (Article 13) based on which the organs of the AU have been able to issue decisions in the areas of space science and technology. The Council is also responsible for the implementation of the policies formulated by the Assembly. Finally, it instructs the activities of the **Permanent Representatives Committee (PRC)**, which is also responsible for preparing the work of the Executive Council. It comprises Permanent Representatives to the Union and other plenipotentiaries of Member States.

At the same institutional level, the Assembly can establish thematic committees. These are the so-called **Specialised Technical Committees (STCs)**, which are composed of Member State ministers or senior officials and are responsible to the Executive Council. Notably, the AU Commission for Human Resource, Science and Technology (HRST), under a directive from the African Ministerial Council for Science and Technology (AMCOST) drove the process for developing the 2016 *African Space Policy* and *African Space Strategy*.⁵⁵

On peace and security matters, the Assembly have delegated its powers to the **Peace and Security Council (PSC)** when the Council became operational in 2004.⁵⁶ It is a standing decision-making organ for the prevention, management and resolution of conflicts and has a restricted composition of 15 elected Member States.

The **African Union Commission (AUC)** is the Secretariat. Based in Addis Ababa, it is composed of an elected chairperson, deputy chairperson, six commissioners, and staff. Other AU's most operative bodies are the **five regional**

⁵⁴ The 35th Ordinary Session of the Assembly of Heads of State and Government of the African Union, the last in chronological order, took place on 5-6 February 2022. AU Commission, *African Union Handbook 2021*, Addis Ababa, 2021, p.17.

⁵⁵ MUNSAMI V., NICOLAIDES A., *Investigation of a Governance Framework for an African Space Programme*, in *Space Policy*, February 2020.

⁵⁶ AU, *The Assembly*, at au.int.

groups, whose membership has been defined according to geographical criteria by the OAU in 1976,⁵⁷ and the **Regional Economic Communities (RECs)**.⁵⁸

The Regional Economic Communities (RECs)

Overview of the RECs

The RECs are regional groupings of African States that facilitate regional economic integration between their members and through the African Economic Community (AEC).⁵⁹

The Abuja Treaty establishing the AEC recognised the efforts already made in **sub-regional sectoral economic cooperation** and the need to share, in an equitable manner, the advantages of cooperation among the Member States.⁶⁰ Therefore, Article 6 of the Treaty provided for the gradual establishment of the Community in six stages of variable duration over a transitional period not exceeding thirty-four years.

As a first step, the Abuja Treaty introduced the notion of RECs as building blocks of the AEC and called for their reinforcement and consolidation. The Treaty did not exactly specify the membership of the RECs, but it indicated that the regional communities would cover North, West, Central, Eastern and Southern Africa. This led to the designation of the already existing **Arab Maghreb Union (UMA)**, **Economic Community of West African States (ECOWAS)**, **Economic Community of Central African States (ECCAS)**, **Common Market for Eastern and Southern Africa (COMESA)** and **Southern African Development Community (SADC)** as RECs. Besides the five RECs recognised by the Abuja Treaty, three more RECs have recently been given formal recognition by the AU: **Community of Sahel-Saharan States (CEN- SAD)**, **East African Community (EAC)**, **Intergovernmental Authority on Development (IGAD)**.

⁵⁷ OAU Council of Ministers, *Resolution on the Division of Africa into Five Regions*, CM/Res. 464 (XXVI), 1976.

⁵⁸ AU Commission, *African Union Handbook 2021*, cit.

⁵⁹ CHAYTO B., *The Development of a Continental Services Market: An Opportunity For Africa's Transformation*, in African Technology Development Forum.

⁶⁰ *Treaty Establishing the African Economic Community*, cit., Preamble.

The RECs, established before their official recognition by the OAU in 1991, have developed individually, having today differing roles and structures.⁶¹ Each REC is rooted in specific geographical, historical, economic, and political environments and has its own founding Treaty setting up a **variety of objectives and priorities**.

Each REC organises high-level annual meetings or Summits of Heads of States and other meetings of the Council of Ministers. Most founding Treaties also provides for the establishment of organisational structures, which include directorates, departments, committees, and secretariats staffed with focusing on targeted areas. Most RECs pursue economic integration among States of a regional area by eliminating policy barriers to trade and investment, while others have more comprehensive mandates, such as collaboration on cross-border sectors like transport and communication, and the environment, or carry-on joint security, political and social endeavours. This is often referred to as **functional cooperation**.

In this line, it is to note that most African States work with, or through, organisations that best represent their interests and that are functional to their development. These organisations include **further regional or sub-regional bodies** that fall outside the purview of the eight RECs.⁶² This also explains why RECs have multiple and overlapping memberships.

⁶¹ AU Commission, *African Union Handbook 2021*, cit.

⁶² KARKARE P., BYIERS B., *Making Sense of Regional Integration in Africa*, European Centre for Development Policy Management, 7 July 2019.

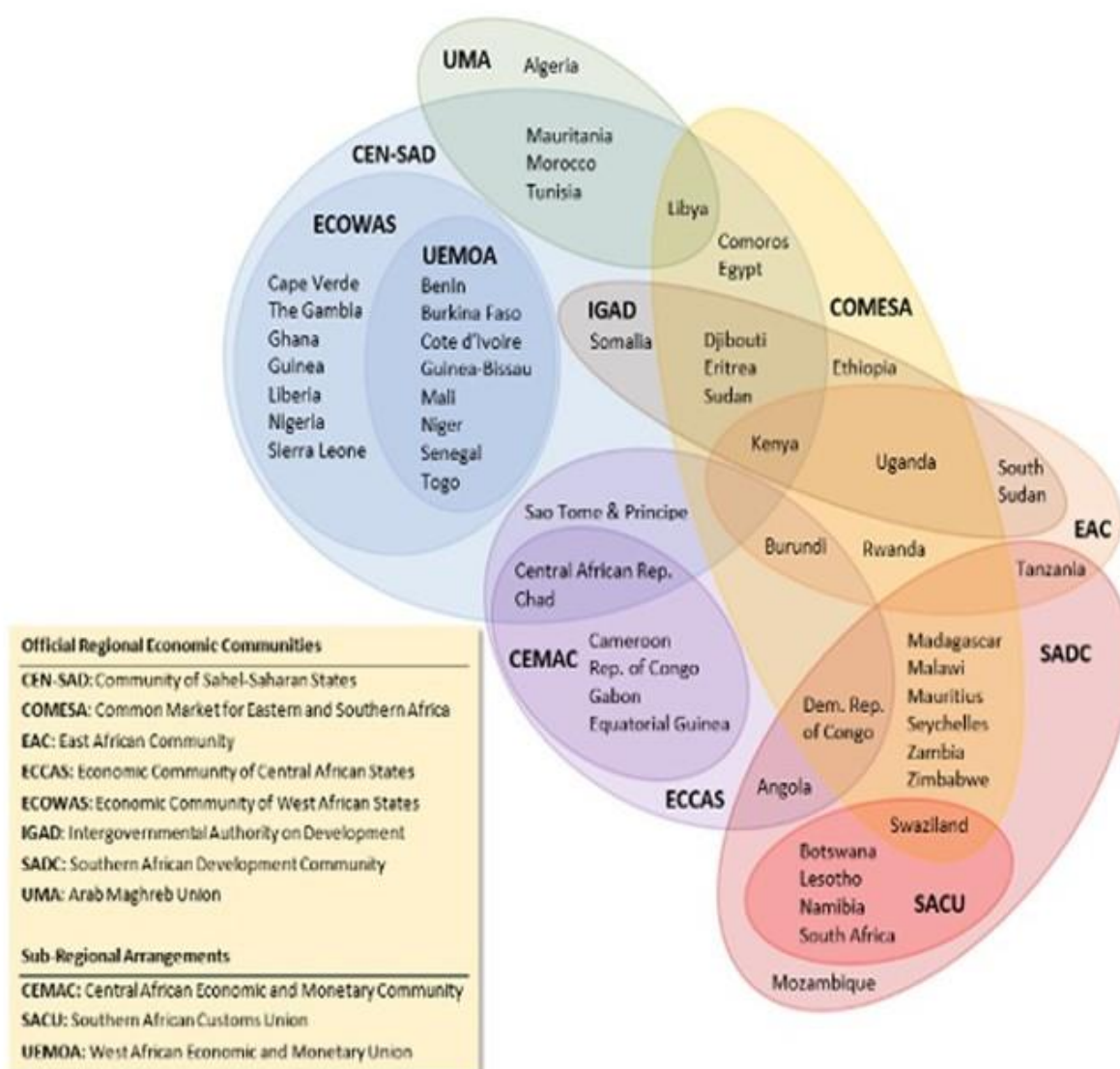


FIG. 4 Membership of Regional Economic Communities (RECs). Source: *UNECA*

With reference to this aspect, the OAU, and then the AU, tried over the years to achieve rationalisation of sub-regional organisations, which has been parallel to an ever-growing involvement of RECs in pursuing continental integration in different sectors.

The Relationship between AU and RECs

RECs remain **formally independent** of the AU, but they all maintain a close relationship with it.⁶³ The relationship between the AU and the RECs is mandated by the Abuja Treaty and the AU Constitutive Act and guided by the following instruments: the 2008 Protocol on Relations between the RECs and the AU, repealed by the revised Protocol on Relations between the AU and the RECs entered into force on 10 November 2021;⁶⁴ a specific Protocol and a Memorandum of Understanding on peace and security matters;⁶⁵ and the *Agenda 2063*.

Recent years witnessed efforts by the AU to achieve a clear **division of labour** and effective collaboration among the African Union and the RECs, as well as the Regional Mechanisms (RMs), the Member States, and other continental institutions.⁶⁶

AU-RECs relations are based on the principle of subsidiarity and should thereby allow the RECs to advance the integration agenda in specific areas. Specifically, the Protocol on Relations mandates the RECs to take the necessary steps to review their treaties in order to establish an organic link with the Union.⁶⁷ Bodies have also been set up for coordinating policies, measures, programmes, and activities of RECs and ensuring the implementation of the Protocol, namely the **Mid-Year Coordination Meeting** among the Chairpersons of the RECs, the Commission and the RMs; the **Committee on Co-ordination**, and the **Committee of Secretariat Officials**.⁶⁸

⁶³ GNANGUËNON A., *Mapping African Regional Cooperation: How to Navigate Africa's Institutional Landscape*, European Council on Foreign Relations. Policy Brief, 1 October 2020.

⁶⁴ AU Executive Council, *Draft Revised Protocol on Relations Between the African Union and the Regional Economic Communities*, EX.CL/1221(XXXVI)iii, Addis Ababa, Ethiopia, 2020. So far, the AU, ECCAS, CEN-SAD, SADC, and COMESA signed the Protocol.

⁶⁵ Namely, the 2002 *Protocol Relating to the Establishment of the African Union Peace and Security Council* and the 2008 *Memorandum of Understanding (MoU) on Cooperation in the Area of Peace and Security between the AU, RECs and the Regional Mechanisms (RMs) for Conflict Prevention, Management and Resolution of Regional Standby Brigades of Eastern and North Africa*.

⁶⁶ AU Assembly, *Decision on the Follow Up to the First Mid-Year Coordination Meeting Between the African Union and the Regional Economic Communities*, Assembly/AU/Dec.767(XXXIII), Addis Ababa, Ethiopia, 2020.

⁶⁷ AU Executive Council, *Draft Revised Protocol on Relations Between the African Union and the Regional Economic Communities*, *cit.*

⁶⁸ *Ibidem*.

The Reform of the African Union

The AU reform agenda originated through an arrangement of a Troika composed of AU Chairpersons for 2016, 2017, and 2018 and is oriented to an **institutional re-configuration** of the African Union. This has been felt necessary to promoting regional integration and strengthening African collective action. Indeed, the AU oversees the advancement of a united continental agenda, *Agenda 2063*, whose objective is to attain an “integrated, prosperous and peaceful Africa, driven by its citizens and representing a dynamic force in the international arena.”⁶⁹

The main element of such a reform is the indication for the AU to focus on **key priorities with continental scope** to channel AU resources strategically and avoid the scenario of a fragmented and ineffective organisation. Political affairs, peace and security, economic integration, and Africa’s global representation and voice represent the identified areas, which are by nature continental in scope. Accordingly, a clear division of labour and effective collaboration between the AU, the RECs, the RMs, the Member States, and other continental institutions has been mandated.⁷⁰

At the **First Mid-Year Coordination Meeting** held in Niamey, Niger, on 8 July 2019, the Parties adopted the “Division of Labour Between AU Commission, Regional Economic Communities and Member States”. The document sets up the division of competencies and prerogatives of the AU, the RECs, and the Member States respectively in different areas, namely, policy planning and formulation, policy adoption, implementation, monitoring and evaluation, partnerships, joint resource mobilisation.⁷¹

Since its launch, the reform process has addressed financial overdependence on external partners, the underperformance of some AU organs and institutions, and the working relations between the AU Commission, and regional entities and Member States. Nevertheless, the results of the Reform will have to be assessed in the long term.

⁶⁹ AU, Assembly, *Agenda 2063. The Africa We Want, cit.*

⁷⁰ Assembly of the Union, *Decision on the Outcome of the Retreat of the Assembly of the African Union on the Institutional Reform of the African Union*, Assembly/AU/Dec.635(XXVIII), Addis Ababa, Ethiopia, 31 January 2017.

⁷¹ First Mid-Year Coordination Meeting, *Division of Labour Between AU Commission, Regional Economic Communities and Member States*, MYCM/AU/4(I)Rev.1, Niamey, Niger, 8 July 2019.

The appointment of the new AU Commission in February 2021 for the term 2021-2024 by the AU Assembly is a milestone in the implementation of the ongoing AU institutional reform. This reflects the Reform's aim of implementing a leaner, streamlined and service-oriented leadership structure as the new Commission consists of the Chairperson, the Deputy Chairperson and six Commissioners, instead of the previous eight.⁷²

Final Remarks

At the beginning, the growth of the space sector was fostered by the development of international cooperation through the creation of a number of separate initiatives with a sub-regional dimension. Attempts to bring together all these actions for creating synergised and complementary programmes followed the establishment of continent-wide initiatives, above all the ALC Conference in 2005.

Starting from 2010, such initiatives have been accompanied by the entering of the African Union as a major player in the African space landscape alongside the States. While international Conferences, including the ALC ones, are crucial in fostering awareness of the benefits of space applications and for coordinating actions in this perspective, the background for such actions is now the African institutional framework for space activities established by the AU. In this regard, it is significant that the ALC Conference held in 2019 was themed "Implementation of the African Space Policy and Strategy" with a Sub-theme of "Positioning the African Space Agencies, Institutions, Industries and Academia for the implementation of Africa Space Policy and Strategy".

Moreover, it has been noted that the AU institutional framework is a vast machinery, characterised by constant evolution in order to meet the evolving needs and aspirations of the African countries. In this sense, an overview was provided of the path that led to the current framework as well as a look at the functioning and competences. Particular attention has been paid to those AU organs that were mostly involved in the process leading to the development of the African institutional space governance.

The African governance is flanked by activities conducted at the sub-regional and national levels to pursue the objectives of the AU's ambitious agenda. Member

⁷² AU, *AU Assembly Elects Leaders of The AU Commission: 2021-2024: Mr Moussa Faki Mahamat Re-Elected as Chairperson & Dr Monique Nsanzabaganwa Elected as The 1st Female Deputy Chairperson of The Commission*, 22 February 2021.

States are primarily responsible for monitoring and evaluating the implementation of *Agenda 2063* within the national context, reporting to RECs that are responsible for their integration and for facilitating regional initiatives.

The relationship between the regional and sub-regional entities is of particular importance, as highlighted by the objectives set in the ongoing reform of the AU. Indeed, at the sub-regional level, the RECs support and strengthen regional economic integration between Members of the individual regions and through the AEC. While RECs remain independent of the AU, they work in close collaboration to achieve the objectives of sustainable development of the continent.

As for the space sector, it has been noted that the role of RECs is still marginalised, and a more incisive action would be desirable. In this sense, the Statute of African Space Agency (AfSA) contains provisions that refer to the role of the Agency in supporting not only Member States, but also RECs, in building their space programmes and coordinating space efforts across the continent and critical infrastructure, and coherently developing, upgrading and operating cutting-edge African space infrastructure. The Statute also provides for the participation of one representative of the eight RECs recognised by the AU in the Advisory Committee to the Council of the Agency.

The establishment of the AfSA and the involvement of the RECs in its work represent one step toward the realisation of the *African Space Policy's* objective of coordinating and managing continental-level space activities by establishing a corporate space governance, which is defined in the *African Space Strategy* as “the anatomy and inter-relationship of administrative and managerial processes that guide the decision-making chains of the African Space Programme.”⁷³ It remains to see how it will be implemented.

⁷³ AU Assembly, *African Space Policy*, *supra* note 11; AU Assembly, *African Space Strategy*, *cit.*, p. 5. See also Section 3.

3. THE AFRICAN UNION SPACE PROGRAMME

The section examines the normative and institutional governance of space activities in Africa. In providing an analysis of the African Outer Space Programme, it first investigates the main driver for the development of such a programme, which has been identified in the will of countries to harness the benefits of space applications to attain sustainable development objectives.

Space Activities and Sustainable Development as Mutual Drivers

Progressive Recognition of Sustainable Development

Sustainable development and space activities are core drivers for the economic growth and social progress of African States. Connections are identified between the expansion of outer space activities, on the one hand, and the attainment of sustainable development objectives, on the other hand. This explains the reasons behind the decision of the African Union to include the “Outer Space Strategy” among the Flagship Projects of the *Agenda 2063*.

Sustainable development finds its roots in the 1980s with the work of the World Commission on Environment and Development (WCED, or “Brundtland Commission”), which led to the publication of the Report *Our Common Future* in 1987, embedding the emerging concept of sustainable development as a development that “meets the needs of the present without compromising the ability of future generations to meet their own needs.”⁷⁴ The notion found a more defined content in the principles enshrined in the 1992 Rio Declaration, adopted during the UN Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992.⁷⁵ On that occasion, world leaders recognized the need to reconcile economic development with environmental considerations, identifying the first two components of sustainable development, i.e., **economic growth** and the **protection of the environment**. After the 1995 World Summit for Social Development in Copenhagen, the economic and environmental perspectives were complemented with the need to include the **social aspects** of development

⁷⁴ WCED, *Report of the World Commission on Environment and Development: Our Common Future*, 1987, para. 27.

⁷⁵ MARCHISIO S., *Gli atti di Rio nel diritto internazionale*, in *Rivista di diritto internazionale*, 1992, pp. 581-621; CORDINI G., FOIS P., MARCHISIO S., *Diritto ambientale. Profili internazionali europei e comparati*³, Torino, 2017, pp. 13-18.

which were recognized during the 1997 Special Session of the United Nations (UN) General Assembly (Rio+5), held in New York.⁷⁶ Since then, three pillars are identified - economic, social, and environmental - to guide the path to the sustainable development of all countries.

The UN guided the process of consolidating sustainable development through raising awareness and, in 2000, the UN General Assembly adopted Resolution 88/2, the *Millennium Declaration*, setting 8 Millennium Development Goals (MDGs), which ranged from halving extreme poverty rates to halting the spread of HIV/AIDS and providing universal primary education, all by the target date of 2015.

Following the Rio+20 Conference held in 2012, **17 further objectives**, the Sustainable Development Goals (SDGs) were identified, and then incorporated in the *2030 Agenda for Sustainable Development*,⁷⁷ adopted by all UN Member States in 2015. The *Agenda* provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. The 17 SDGs are an urgent call for action by all countries in a global partnership, encompassing the three pillars of sustainable development and recognize that ending poverty and other deprivations must go hand in hand with strategies that improve health and education, reduce inequality, and spur economic growth, all while tackling climate change and working to preserve the environment and its resources.

Sustainable Development Goals in Africa

The Sustainable Development Goals have a **universal vocation** to meet the needs of all humankind. The challenges to the concrete achievement of development goals depend on the very characteristics of every social, economic and legal system in which they are expected to be reached. Countries worldwide may face different obstacles to reach sustainable development and the contribution of space applications varies accordingly.

The starting point to address the **contribution of space activities** for sustainable development in Africa, from both a regional and a national perspective, is the **identification of the continent's needs**, the hindrances to meeting them, and the contribution that space applications may have in facing them. In this light, the African economic, environmental and social landscape shape the African space ecosystems, both as a continent, and as single countries.

Africa is home to 55 countries covering some 30.4 million square kilometres. It is the second largest and second most populous continent on Earth, with an

⁷⁶ MARCHISIO S., *Il principio dello sviluppo sostenibile nel diritto internazionale*, in MARCHISIO S., RASPADORI F., MANEGGIA A. (eds.), *Rio cinque anni dopo*, Milano, 1998, pp. 57 ff.

⁷⁷ *Transforming our World: the 2030 Agenda for Sustainable Development*, cit.

estimated population of 1.37 billion people as of 2021, doubled in the last 25 years.⁷⁸ The aggregate GDP of the continent has reached USD 2.2 trillion, and it is expected to grow 4.1% in 2022.⁷⁹ In terms of **societal changes**, the continent is characterized by mass movement, migration, and demographic growth, with more than 60% of citizens being under 30 years of age.

From an **economic viewpoint**, the African continent is expanding and moving towards a resilient and 'knowledge-based economy',⁸⁰ with a focus on technology, financial and e-commerce services. In the last quarter of century, Africa has undergone impressive growth, mainly in the sectors of the export of commodities (fuel, minerals), tourism and agriculture.⁸¹ Notably, agriculture is by far the most important economic activity. It provides employment for about two-thirds of the continent's working population and for each country contributes an average of 30 to 60 % of GDP, and about 30% of the value of exports.⁸²

The path towards the achievement of the SDGs in Africa is variable depending on countries and regions. Africa is still facing overarching **challenges in terms of infrastructures, urbanization, and digital access**,⁸³ with varying performances according to regions and local economic characteristics. Some countries are experiencing economic uncertainty due to conflict-areas, diseases, poverty, the decline in commodity prices, as well as the Covid-19 pandemic⁸⁴ that has marked a growth decrease in 2020 with a significant disruption of the tourism industry. Aggregate data also show different speeds of progress from one Goal to another. According to the 2020 edition of the *Africa SDG Index and Dashboards Report*,⁸⁵ the Goals facing the greatest challenges in the region are **SDG 3** – Good health and wellbeing, **SDG 9** – Industry, innovation and infrastructure, and **SDG 16** – Peace, justice, and strong institutions. The Report conversely underlines that SDG 12 – Responsible consumption and production

⁷⁸ United Nations Population Fund, *World Population Dashboard*, available at <https://www.unfpa.org/data/world-population-dashboard>.

⁷⁹ African Development Bank, *African Economic Outlook – From Debt Resolution to Growth: the Road Ahead for Africa*, 2022, p. 4.

⁸⁰ According to the OECD "the knowledge-based economy" is an expression aiming to describe trends in advanced economies towards greater dependence on knowledge, information and high skill levels, and the increasing need for ready access to all of these by the business and public sectors (OECD, *The Measurement of Scientific and Technological Activities: Guidelines for Collecting and Interpreting Innovation Data: Oslo Manual*, Third Edition, OECD, Paris, 2005, para. 71).

⁸¹ ZAMFIR I., *Africa's Economic Growth*, European Parliamentary Research Service, January 2016, p. 9, 18.

⁸² Oxford Business Group, *Agriculture in Africa 2021*, April 2021.

⁸³ OECD/ACET, *Quality Infrastructure in 21st Century Africa: Prioritising, Accelerating and Scaling up in the Context of Pida (2021-30)*, 2020.

⁸⁴ United Nations, *Impact of Covid-19 in Africa*, Policy Brief, 2020, p. 28.

⁸⁵ The Sustainable Development Goals Center for Africa and Sustainable Development Solutions Network (SDSN), *Africa SDG Index and Dashboards Report 2020*, July 2020.

is also an area of better performance for Africa overall and African countries are on track with regard to **SDG 13** – Climate action. From this perspective, more than 30 countries have adopted and implemented risk-reduction strategies in line with the *Sendai Framework for Disaster Risk Reduction*.⁸⁶ Major efforts are also invested in the preservation of natural resources, for instance, according to the UN studies, Africa outperforms most of other continents in terms of conservation and sustainable use of mountain resources.⁸⁷

In 2021, the 7th session of the **Africa Regional Forum on Sustainable Development** was convened under the theme “Building Forward Better: Towards a Resilient and Green Africa to Achieve the 2030 Agenda and Agenda 2063.” The Forum recognized the different levels of progress in the achievement of the SDGs and fostered a ‘leave no one behind’ approach,⁸⁸ consistent with *Agenda 2030*, through the promotion of concerted efforts.

Space Activities for Promoting the Three Pillars of Sustainable Development

Space activities are growing in number and variety, sided by the increase in the number of space actors at an exponential rate. Space science and technology are now intrinsic to our daily lives and bring an **abundance of unique and fundamental benefits to Earth**. Most space activities are oriented to providing benefits on Earth and, in a way or another, improve the life of human beings. This implies that space activities have an **outstanding social impact**, bettering life conditions, especially for less developed countries that face challenges in providing essential services to their population, such as telephone coverage or internet connection.

Further, space applications have an impact on the **well-being of the Earth**, providing essential tools for the protection of the environment, disaster management and climate change mitigation and adaptation.

There is also an **economic value** in space endeavours, starting from the ‘traditional’ domains as **Earth observation, satellite telecommunications and navigation and positioning**, to the more recent ones, such as constellations of small satellites and the new projects of space exploration. In this context, space

⁸⁶ The Sendai Framework for Disaster Risk Reduction 2015-2030 outlines seven targets and four priorities for action to prevent new and reduce existing disaster risks. The Framework was adopted at the Third UN World Conference on Disaster Risk Reduction in Sendai, Japan, in March 2015.

⁸⁷ UNDP, African Union Commission, *Africa Sustainable Development Report*, 2019, p. 16.

⁸⁸ 7th Session of the Africa Regional Forum on Sustainable Development (ARFSD-7), 1-4 March 2021, Brazzaville, Republic of Congo, Summary Report, p. 7.

activities are **instrumental to sustainable development** in all its three dimensions, i.e., economic, environmental, and social.

The UN Office for Outer Space Affairs (UNOOSA) and the UN Committee on the Peaceful Uses of Outer Space (COPUOS) have promoted international cooperation and fostered a process of awareness-raising about the contribution of space activities to sustainable development, that led to the adoption of the *Space 2030 Agenda: Space as a Driver for Sustainable Development* at COPUOS Sixty-fourth session in 2021.⁸⁹ The *Agenda* identifies four objectives that are structured around the complementary and mutually reinforcing four pillars of space economy, space society, space accessibility and space diplomacy. The objectives encompass the key vision to enhance the benefits of space applications for sustainable development for all countries, build partnerships and strengthen international cooperation in the peaceful uses of outer space in order to align the international policies on outer space activities to the SDGs and to support the implementation of the *2030 Agenda*, the *Sendai Framework for Disaster Risk Reduction* and the *2015 Paris Agreement*.

The use of space applications is a key component for achieving development agendas worldwide, especially in countries that face specific sustainability challenges, as the African ones. In this sense, space activities and sustainable development are seen as **mutual drivers** in a virtuous circle. On the one hand, the need to make progress in the achievement of development objectives boosts the undertaking of space activities. On the other hand, space activities contribute to the advancements on development targets, with relevant economic, environmental and social impacts.

From the perspective of **economic growth**, space applications give a twofold input. First, it directly enables GDP and employment growth, in particular for youth, through the **creation or enlargement of space companies**, stimulating societal and economic benefits. Secondly, it indirectly favours the growth of other industrial domains that are functional to the space sector for meeting the needs of the space supply chain, as manufacturing and electronics. These spill-overs comprehensively benefit the economic system of the concerned country. **Stimulating national production** through the emerging space sector facilitates technology development, as well as creates and retains high-skilled labour, avoiding the brain drain. The development of a national upstream and downstream space sector also allows African countries to reduce reliance on foreign space services.⁹⁰

⁸⁹ *The “Space 2030” Agenda: Space as a Driver of Sustainable Development*, A/RES/76/3, 28 October 2021.

⁹⁰ According to the Organisation for Economic Cooperation and Development (OECD) Space Forum, the upstream segment includes research, space manufacturing and ground systems (fundamental and applied research activities, scientific and engineering support activities,

The **environmental pillar** of sustainable development is also remarkably boosted by space activities. In this context, **Earth Observation (EO) constitutes a paramount asset**. The application is used to **support key sectors**, such as agriculture, management of natural resources, forecasting of natural disasters, climate change mitigation and adaptation, protection of the environment, waterways and coasts. EO data and services have a striking potential to address environmental challenges and development priorities, and to implement national, regional and international commitments.⁹¹

However, **data-gathering and analysis** represent an area for improvement in the achievement of development targets. Indeed, Africa is considered a data-scarce continent, with few States performing systematic data collection through census and household surveys. Accurate statistical information is critical for planning, allocation of resources, supporting national policy and decision-making related to the provision of health facilities, housing, and other amenities. But, due to the excessive cost of conducting such surveys, not all African countries are able to provide accurate and reliable data at the required intervals and frequencies to support policy and decision-making, and increased efforts are put to rely on EO services.

The use of technology for environmental purposes is also envisaged in multilateral conventions concluded between African countries. For instance, Article 52 of the *Abuja Treaty*⁹² provides the obligation for the Parties to share know-how in the use of data for the management of natural resources. The use of technology and cooperation is also mentioned in Article XIX of the *African Convention on the Conservation of Nature and Natural Resources* adopted by the AU Assembly on 11 July 2003 in Maputo.⁹³

When it comes to the **social pillar** of sustainable development, **space-based communication services** provide **connectivity in remote areas** and facilitate access to the internet and the incorporation of Information and Communication Technology (ICT) in public services (e.g., health, education, transportation), improving the quality of life. These services are expected to have an outstanding impact in areas like Sub-Saharan Africa, where only 1 in 5 people has access to

material and components supply, manufacturing of space systems, subsystems and equipment, telemetry, tracking and command stations). The downstream segment includes space operations for terrestrial use, and products and services which rely on satellite technology, signal, data to function (e.g., satellite broadcasting, selected GIS, GNSS-enabled devices).

⁹¹ Digital Earth Africa, *Analysis Ready Data - A Smart Way to Use Earth Observation for Africa's Rising Nations*, Insight Report, May 2022.

⁹² *Treaty Establishing the African Economic Community*, cit.

⁹³ *African Convention on the Conservation of Nature and Natural Resources*, adopted by the 2nd Ordinary Session of the Assembly, Maputo, Mozambique, 11 July 2003, entered into force on 23 July 2016.

the internet. They include emergency communications for disaster relief, **telecommunications for remote education** and, also, **telehealth** and **telemedicine services** in rural areas, while EO technologies also allow to monitor and prevent illegal activities, as human trafficking and to collect relevant data about population and amenities.

In this context, the development of space capabilities by the African countries is a key point in several plans of action elaborated at the continental level in recent years, as the *Agenda 2063*. At the heart of these programmes, there is a willingness to **promote indigenous skills** and technological capabilities.

The Agenda 2063-- “The Africa We Want”

Agenda 2030 and the SDGs identified therein are sided by development targets set at the regional level and embedded in the *Agenda 2063-- The Africa We Want*, the **strategic document** adopted in January 2013 under the auspices of the AU, that aims to achieve inclusive and sustainable development goals on the African continent.⁹⁴

The genesis of *Agenda 2063* was boosted by the African leaders’ renewed awareness of the need to refocus and reprioritise Africa’s agenda from the previous fight against apartheid and attainment of political independence for the continent, which had been the focus of the former Organisation of African Unity, to new needs. As an affirmation of their commitment to support Africa’s new path for attaining inclusive and sustainable economic growth and development, African Heads of State and Government signed the *50th Anniversary Solemn Declaration* in May 2013.⁹⁵ The Declaration marked the re-dedication of Africa towards the attainment of the Pan African Vision of “an integrated, prosperous and peaceful Africa, driven by its own citizens, representing a dynamic force in the international arena” and the *Agenda 2063* is the concrete manifestation of how the continent intends to achieve this vision within a 50-year period, from 2013 to 2063.

The Agenda represents a realistic manifestation of the pan-African struggle for unity, self-determination, freedom, progress, and collective prosperity pursued under Pan-Africanism and African Renaissance and contains **seven aspirations** to guide its concrete implementation. These refer to an inclusive social and economic development, continental and regional integration, the consolidation of

⁹⁴ AU Assembly, *Agenda 2063*, *supra* note 10; see also AU Commission, *Agenda 2063 - The Africa We Want*, September 2015.

⁹⁵ *50th Anniversary Solemn Declaration adopted by the 21st Ordinary session of the Assembly Heads of State and Government of the African Union*, Addis Ababa, 26 May 2013.

democratic governance, as well as peace and security stabilization in order to reposition Africa as a dominant player in the global arena.

Agenda 2063 on the one hand complements the goals and priorities set at the global level through *Agenda 2030* and the SDGs, and, on the other hand, is harmonized to these latter as it is chronologically earlier than the 2015 *Agenda 2030*.

Outer Space as a Flagship Project of the Agenda 2063

Agenda 2063 identifies **15 flagship projects** to boost Africa's economic growth and development and lead its rapid transformation.⁹⁶

The “**Africa Outer Space Strategy**” flagship programme No. 11 recognizes the need to **accelerate access to space technologies and products**, as well as to **adopt appropriate policies and strategies** to develop a regional market for space products in Africa.

Space applications represent critical infrastructures for the development of the continent and the management of its natural resources. Furthermore, the development of space-related applications and services is considered instrumental to the implementation of the AU *Science, Technology, and Innovation Strategy for Africa 2024* (STISA-2024). **STISA-2024** is the first of the ten-year incremental phasing strategies to respond to the demand for science, technology, and innovation to impact across critical sectors such as agriculture, energy, environment, health, infrastructure development, security and water. Notably, in priority “**Protection of our space**”, space-derived services are presented as a unique opportunity for the continent to collectively address socio-economic development issues and for conserving the welfare of current and future generations. The inclusion of the Outer Space programme in *Agenda 2063* and the mention of space applications in STISA-2024 is a strong indication from the highest authorities to stamp their commitment to an African coordinated space process.

Moreover, the **First Ten-Year Implementation Plan of Agenda 2063**, spanning from 2014 to 2023, and endorsed in June 2015 during the Summit of the African Union, outlines a set of goals, priority areas and targets that the continent aims to achieve at national, regional and continental levels. The AU presented its **First Continental Report** on *Agenda 2063* at the 33rd AU Summit in February 2020. It particularly focuses on the African Outer Space Programme, highlighting the necessity to strengthen dialogues between the African Union with African space

⁹⁶ A list of the Flagship Projects of the *Agenda 2063* is available at <https://au.int/en/agenda2063/flagship-projects>.

actors in order to develop **operational programmes** and missions in the fields of EO and satellite navigation.⁹⁷ In addition, it deals with the **structural and financial implications of the African Space Agency** (see *infra*), as well as the support of Member States, RECs and other institutions to render effective the Agency, including capacity building in areas such as EO, satellite communication, navigation, space science and astronomy.

The **Second Continental Report** on the implementation of the First Ten-Year Implementation Plan of *Agenda 2063*, published in February 2022, notes the progress achieved in the field of space applications, especially EO to improve management of the environment, as well as in terms of education and capacity-building.⁹⁸

The African Space Policy and Strategy

With regard to the governance of space activities in Africa, for many years space programmes have suffered from a lack of coordination at the African Union level, due to some scepticism around the effectiveness of the organisation, making it unclear the mechanisms for the realisation of space projects.⁹⁹ The AU had so far an almost absent role as coordinating entity for space activities and in the development of a shared African vision and position at the international level on space-related matters.¹⁰⁰

In March 2010, at the 4th African Ministerial Conference on Science and Technology (AMCOST IV), Ministries recommended the setting-up of a Space Working Group (SWG) to develop a draft African space policy and strategy. The SWG was chaired by South Africa and composed of Algeria, Cameroon, the Republic of Congo, Egypt, Ghana, Kenya, Nigeria, Namibia and Tanzania. Thus, between 2013 and 2014 a draft document on the African space policy and strategy was elaborated, by also incorporating inputs from different user sectors, the Ministers in charge of space matters in the continent and the African Ministerial Conferences. As noted, the same “Africa Outer Space Strategy” flagship project of *Agenda 2063* envisioned the adoption of an appropriate space policy and strategy at the continental level.

⁹⁷ AUC&AUDA/NEPAD, *First Continental Report on the Implementation of Agenda 2063*, 2020, p. 37.

⁹⁸ AUC&AUDA/NEPAD, *Second Continental Report on the Implementation of Agenda 2063*, 2022, p. 60.

⁹⁹ AGANABA-JEANTY T., *Realizing a Regional African Space Program*, in HOFMANN M., BLOUNT P.J. (eds.), *Innovation in Outer Space: International and African Legal Perspective*, Baden-Baden, 2018, p. 9.

¹⁰⁰ MARTINEZ P., *The African Leadership Conference on Space Science and Technology for Sustainable Development*, *cit.*

The draft space documents were presented during the World Space Week 2014 celebration in Addis Ababa, and during the African Association of the Remote Sensing of the Environment Conference 2014 in Johannesburg. These events were part of the efforts of the AUC in consulting with stakeholders in the sector and ensuring that Africa would benefit from space science and related technologies for its socio-economic development. On this basis, in January 2016, the AU Heads of State and Government adopted the *African Space Policy* and the *African Space Strategy* with the aim of developing local capacities in EO, satellite communications, navigation and positioning, space sciences and astronomy, in accordance with the *Agenda 2063*.¹⁰¹

The *African Space Policy. Toward Social and Economic Integration* identifies the **key policy goals** that drive the *Agenda* for any formal space initiative on the continent. The policy goals are supported by a set of objectives and principles that articulate the aspects that need to be addressed in developing and maintaining a viable and sustainable space programme. This Policy is **complemented** by the *African Space Strategy. Toward Social and Economic Integration* and its associated implementation plans and governance structure. The Strategy hinges on the *African Space Policy* and is an expression of the key intent and programmes of action needed to give effect to the identified goals and strategic objectives.

Notably, the Space Policy aims at developing a **well-coordinated and integrated African space programme** tailored to address the social, economic, political, and environmental needs of the continent and being competitive at the global level. In order to attain this goal, the *African Space Strategy* prescribes the use of space-derived products and services for decision-making, while the African space programme should be based on indigenous space capabilities, both in the private and public sectors, to be effective and innovative. A prerequisite is the implementation of a regulatory framework that supports an African space programme for the responsible and peaceful use of outer space.

The Strategy identifies **four thematic** areas which provide the broad framework within which the appropriate technology platforms and programmes, both new and current, should evolve to address user and societal needs, as food security, urbanisation and environment. These areas are EO, navigation and positioning, satellite communications and space science and astronomy. The Strategy also identifies the **capabilities and institutional means** (the so-called Functional Platforms) necessary to achieve the objectives in the specific areas and proposes Supporting Programmes in a) space awareness; b) infrastructure development;

¹⁰¹ AU Assembly, 26th Ordinary Session, Assembly/AU/Dec.589(XXVI), Addis Ababa, Ethiopia, 30-31 January 2016.

c) international partnerships; d) human capital development; and e) industrial participation and development.

From an overarching perspective, the space policy and strategy address the **access of African countries to space services, data, and technology**, without, for the moment, including guidelines for the development of independent access to space capabilities. This remains under the remit of national space programmes of those countries capable of financing space activities, stimulating significant private investments or initiating strategic partnerships with spacefaring actors.

Final Remarks

Throughout the years, the role of the African Union has evolved and strengthened with the aim of developing a continental approach to space activities. The AU has ambitious goals for 2063, to be partly achieved using space applications which represent key tools to address the continent's sustainable development challenges from a social, economic and environmental perspective. The AU's leading position is crucial to enable the adoption of initiatives involving all African countries.

The regional highest authorities stamped their commitment to an African concerted and coordinated space process through the adoption of a significant number of programmatic documents in order to guide the realisation of future space programmes. These include: a) the *Agenda 2063*, a strategic instrument to achieve inclusive and sustainable development goals on the African continent; b) the flagship project "African Outer Space Strategy", which recognises the need to accelerate access to space technologies, products and data, as well as to adopt appropriate policies and strategies to develop a regional market; c) the *African Space Policy and Strategy* and d) the *AU Science, Technology, and Innovation Strategy for Africa 2024 (STISA-2024)* which makes reference to space-derived services as unique tools for the continent to address socio-economic development and for conserving the welfare of current and future generations. The adoption of policy instruments is an enabler to create a stimulating environment for the development of space activities, with the main objective of establishing an indigenous space industry.

The role of the AU in the sector, as set-up in such documents, is twofold: on the one hand, its actions are aimed at boosting countries' space programmes, on the other hand, at maximising the benefits deriving from space activities by coordinating such programmes and strengthening partnership between different space actors, namely industry, academia and governments that are part of the African space ecosystem.

The African space programme emerged from concrete needs and objectives outlined in the *Agenda 2063* as well as in the *Space Policy and Strategy*. It brings out from the analysis that regional space policy drives the advancement of a resilient space ecosystem, by fostering innovation and strengthening international partnerships.

4. INSTITUTIONAL SPACE GOVERNANCE: THE AFRICAN SPACE AGENCY

The adoption of the African Space Policy and Strategy represented a landmark for the building of institutional governance of space activities at the continental level. This section reviews the establishment of the African Space Agency in the legal framework of the African Union. It also analyses the objectives set forth in the AfSA Statute and the role of the Agency in promoting and coordinating the implementation of the Space Policy and Strategy.

Institutional Aspects of the African Outer Space Programme

The establishment of the **African Space Agency** has the potential to promote progress in science, technology development and innovation through which African States can synergize their space programmes across the continent and collectively benefit from space activities and applications.¹⁰²

The realisation of the AfSA has been possible since the promotion of space science and technologies falls within the competences attributed to the AU by its Constitutive Act, which include “advance the development of the continent by promoting research in all fields, in particular in science and technology.”¹⁰³

The AU Constitutive Act entrusts coordination in the field of science and technology primarily to the Executive Council,¹⁰⁴ which is assisted in its work by several Specialised Technical Committees.¹⁰⁵ Space matters are referred to the Committee on Education, Science and Technology.¹⁰⁶

In 2013, the Executive Council, while recognizing the significant role that space science and technology can play for Africa’s development, expressed the need to “ensure coordination between all actors and stakeholders in this sector, and

¹⁰² AGABA A., *Transfer of Space Technology in the African Space Agency*, in *Annals of Air & Space*, 2018, p. 255.

¹⁰³ *Constitutive Act of the African Union*, Lomé, Togo, 11 July 2000, Article 3(m).

¹⁰⁴ See Section 2.

¹⁰⁵ The Specialized Committees are established under Article 14 of the AU Constitutive Act, while Article 15 lists their functions.

¹⁰⁶ YUSUF A.A., OUGUERGOUZ F. (eds.), *The African Union: Legal and Institutional Framework*, Leiden-Boston, 2012, pp. 79-94.

especially with regard to the development of an African space policy and strategy, and the creation of relevant institutions such as an African space agency.”¹⁰⁷ Subsequently, the adoption of a series of instruments, such as the 2014 *Science, Technology and Innovation Strategy for Africa* (STISA-2024), and the *African Space Policy* and *African Space Strategy*, highlighted the objectives and actions needed to bolster space activities on the continent and the essential components of the African outer space programme.

In these documents, the creation of appropriate institutions to strengthen space activities on the continent is a key element of the Programme. Accordingly, one of the actions directed towards the set-up of the African outer space programme was the realisation of an inclusive **institutional architecture** to ensure that the *African Space Policy* and *Strategy* are implemented in an effective and coordinated manner.

The AUC SWG considered several **governance options**, including a space office within the AU, a regional space agency forum on the model of the Asian-Pacific Regional Space Agency Forum (APRSAF) and a Treaty organisation on the model of the Asia-Pacific Space Cooperation Organisation (APSCO).

The Establishment of the AfSA as an Organ of the African Union

The path toward the establishment of the AfSA started in 2010.¹⁰⁸ At the 3rd Ordinary session of the Conference of Ministers in charge of Communication and Information Technologies (CITMC), the Ministers issued the *Abuja Declaration*, which requested the AU Commission to conduct a feasibility study on the establishment of an African Space Agency, taking into account existing initiatives.¹⁰⁹ The opportunity to establish the Agency was then included in the AU Commission’s 2014-2017 strategic plan.

The AU Assembly Decision 589(XXVI) of 2016 called for the “development of a framework for the implementation of the *African Space Policy* and *Strategy* and the governance framework that covers the relevant legal requirements and protocols for an operational African space programme.” On this occasion, the

¹⁰⁷ AU Executive Council, *Decision on the Report of the Fifth Ordinary Session of the African Union Conference of Ministers in Charge of Science and Technology*, EX.CL/Dec. 746(XXII), 25 January 2013, para. 4.

¹⁰⁸ AGANABA-JEANTY T., *Realizing a Regional African Space Program*, *cit.*, pp. 269 ff.

¹⁰⁹ Third Conference of African Ministers in Charge of Communication and Information Technologies, *2010 Abuja Declaration*, AU/CITMC-3/MIN/Decl.(III), p. 3.

Assembly recalled Egypt's bid to host the Agency and allocate financial resources for the implementation of the project, and asked the AU Commission and Egypt "to carry out consultations with a view to evaluating the legal, structural and financial implications and report to the Assembly through the relevant structures."¹¹⁰ Accordingly, in October 2017, a draft Statute for the AfSA was considered by the AU second Specialized Technical Committee (STC) on Education, Science and Technology, and prepared for adoption at the AU Summit in January 2018.

The creation of the AfSA addresses the need, underscored in the Preamble of the Statute, for **appropriate institutional arrangements for the effective governance**, promotion and coordination of space activities in order to realize maximum benefits and avoid duplications in terms of resources and efforts. The Statute of the Agency entered into force in 2018 and, at the 32nd ordinary session of the AU Assembly in February 2019,¹¹¹ Egypt was endorsed as the official host of the headquarters of the Agency. On 25th January 2023, the AUC and Egypt concluded the Host Agreement establishing the legal framework between the parties.¹¹²

The AfSA Statute qualifies the **Agency as an organ of the AU** established by the Assembly under Article 5, para. 2 of the AU Constitutive Act. The creation of new organs to deal with specific matters is a frequent practice in the AU, as the list of the AU organs provided in Article 2, para. 1, is not exhaustive. Their establishment is also a straightforward process since it does not require an amendment of the Constitutive Act, but an Assembly decision.¹¹³ The power for the Assembly to institute AU organs comes from Article 9, para. 1(d) of the Constitutive Act.¹¹⁴

¹¹⁰ AU Assembly Decision 589(XXVI), *Decision on the Specialised Technical Committees*, Assembly of the Union, Twenty-Sixth Ordinary Session, 30-31 January 2016, p. 3.

¹¹¹ AU Assembly Decision 676(XXX), 30th Ordinary Session of the AU Assembly, 28-29 January 2018, Addis Ababa, Ethiopia.

¹¹² Besides Egypt, also Nigeria and Ethiopia had submitted proposals for the establishment of the headquarter in their respective territories, while a late bid by Ghana was not considered and Namibia withdrew its bid from consideration before the AU Assembly session. For the host agreement, see IDERAWUMI M., *AUC Inaugurates the African Space Agency*, in *Space in Africa*, 26 January 2023; AU, *Signature of the Host Agreement for the African Space Agency in Cairo*, 24 January 2023, 24 January 2023.

¹¹³ MAGLIVERAS K. D., *The African Union's Outer Space Agenda and the African Space Agency: An Assessment*, in *Zeitschrift für Luft- und Weltraumrecht - German Journal of Air and Space Law*, 2021, pp. 52-68.

¹¹⁴ In this sense, an example is the decision of the AU Assembly to establish the Peace and Security Council of the African Union. This organ was not part of the organs of the Union as stipulated in the Constitutive Act.

The qualification of the AfSA as an organ of the AU has relevant consequences on the powers and functions of the Agency, that are different from those of specialised agencies of the AU, such as the African Civil Aviation Commission (AFCAC) and the African Telecommunications Union (ATU). These latter, in fact, are affiliated to the AU and, as specialised agencies, have their own budget, often funded by direct contribution of Member States (this is the case for AFCAC). Conversely, as an organ of the AU, the AfSA is subject to its administrative, budgetary and financial rules and regulations.¹¹⁵

AfSA Objectives and Functions

The Statute of the AfSA affirms in its Article 3 that the Agency, in order to fulfil its mandate, possesses legal personality and capacity to, *inter alia*, enter into agreements and institute legal proceedings.

Pursuant to Article 4 of the Statute, the Agency has two main **objectives**: first, promoting and coordinating the implementation of the *African Space Policy and Strategy*; second, conducting activities that exploit space technologies and applications for sustainable development and improvement of the welfare of African citizens. Moreover, the AfSA is tasked to harness the potential benefits of space science; strengthen space missions on the continent in order to ensure optimal access to space-derived data, information, services and products; develop a sustainable space market and industry that promotes and responds to the needs of the African continent; adopt good corporate governance and best practices for the coordinated management of continental space activities; maximize the benefits of current and planned space activities, and avoid or minimize duplication of resources and efforts; and promote an African-led space agenda through mutually beneficial partnerships.

These objectives are further elaborated in Article 5, which sets out the **functions** of the Agency. The primary function is the implementation of the *African Space Policy and Strategy*. Moreover the Agency is tasked with, among others, support Member States and RECs in building their space programmes and coordinate space efforts across the continent; foster regional coordination and collaboration; promote strategic intra-continental and international partnerships; engage Member States in space-related activities and research in Africa with the aim of fostering cooperation and avoiding duplication of efforts; take maximum

¹¹⁵ OFFIONG E.O., *The African Outer Space Programme: Five Agenda Items for the 35th African Union (AU) Summit*, in School of Transnational Governance Policy Papers, Issue 2022/03, February 2022.

advantage of national activities conducted by Member States and facilitate their coordination.

The **institutional governance and management of the AfSA** consist of the African Space Council; the Advisory Committee; the Secretariat; and the Director General. The 10 Heads of State and Government championing Education, Science and Technology also belong to the structure of the Agency to provide political guidance and serve for enhancing space science and technology at the continental level. Last, the AU Specialised Technical Committee on Education, Science and Technology provides overall strategic guidance and orientation to the Agency through the Space Council.

An Assessment of the AfSA and its Role in the African Space Sector

The emerging role of the AU in the space sector and the adoption of the *African Space Policy and Strategy* had a continent-wide impact in raising awareness of the benefits of space applications. At the same time, the process leading to the adoption of the AfSA's Statute was characterized by the formulation of different opinions on its role. Some commentators argued that the establishment of a continental space agency was not an immediate necessity,¹¹⁶ while others were of the view that it was highly needed.¹¹⁷ Other suggestions provided for the establishment of a treaty-based space organisation or a Space Secretariat within the AU Commission,¹¹⁸ while others considered the AfSA as the only means to achieve autonomy in the space domain. The different views on the role of a regional space agency and options for its establishment were exceeded by the decision of AU's Member States to establish the Agency as an AU organ. This choice determines a governance structure of the outer space programme oriented to continental efforts for elaborating adaptive solutions for present and future needs of the African space sector.¹¹⁹

The creation of the AfSA places the AU among the international organisations active in the space domain and it stands as a milestone achievement for the African space sector. In this sense, the 2020 Report on the United

¹¹⁶ MARTINEZ P., *Is there a Need for an African Space Agency?*, in *Space Policy*, 2012, pp. 142-145.

¹¹⁷ AGANABA-JEANTY T., *Precursor to an African Space Agency: Commentary on Dr Peter Martinez "Is there a Need for an African Space Agency?"*, in *Space Policy*, 2013, pp. 168-174.

¹¹⁸ MUNSAMI V., NICOLAIDES A., *Investigation of a Governance Framework for an African Space Programme*, in *Space Policy*, 2020.

¹¹⁹ ASIYANBOLA O.A., OGUNSINA M.A., AKINWALE A.T., ODEY J.B., *Toward African Space Autonomy: Developmental Framework and Incorporated Synergies*, in *New Space*, 2021, p. 52.

Nations/Economic Commission for Africa Conference on Space Law and Policy acknowledged that the establishment of the AfSA constitutes an **important step towards African space infrastructure**.¹²⁰

With the institution of the AfSA, Africa joined other regional areas in defining a continental dimension for cooperation in space activities. The global scenario in this sense is highly diversified. Regional cooperation initiatives have indeed taken various institutional setups, ranging from the AfSA itself as an organ of the AU, to international organization, e.g., the European Space Agency (ESA) and the Asia Pacific Space Cooperation Organization (APSCO), and international forum created and operating within wider frameworks, e.g., the Asian-Pacific Regional Space Agency Forum (APRSAF).

The creation of regional entities to foster cooperation among countries in space activities has been a growing occurrence in the last years. Indeed, the establishment of the AfSA has just temporally anticipated other two initiatives that led, on the one hand, to the building up of the European Union Agency for the Space Programme (EUSPA), and, on the other hand, to the creation of the Latin American and Caribbean Space Agency (ALCE). The first was the result of the EU decision to expand the scope of the former European GNSS Agency to manage the new EU space programme, officially launched in April 2021.¹²¹ Whereas, the Constitutive Act of the ALCE was adopted on September 2021, at the VI Summit of Heads of State and Government of the Community of Latin American and Caribbean States (CELAC) by 18 Caribbean and Latin American States.¹²²

¹²⁰ UN doc, A/AC.105/1242, 14 April 2021, p. 5.

¹²¹ *Regulation (EU) 2021/696 of the European Parliament and of the Council establishing the Union Space Programme and the European Union Agency for the Space Programme and repealing Regulations (EU) No 912/2010, (EU) No 1285/2013 and (EU) No 377/2014 and Decision No 541/2014/EU*, 28 April 2021.

¹²² Antigua and Barbuda, Argentina, Bolivia, Costa Rica, Cuba, Dominica, Ecuador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Saint Vincent and the Grenadines, Saint Lucia and Venezuela. The ALCE has been headquartered in Mexico.

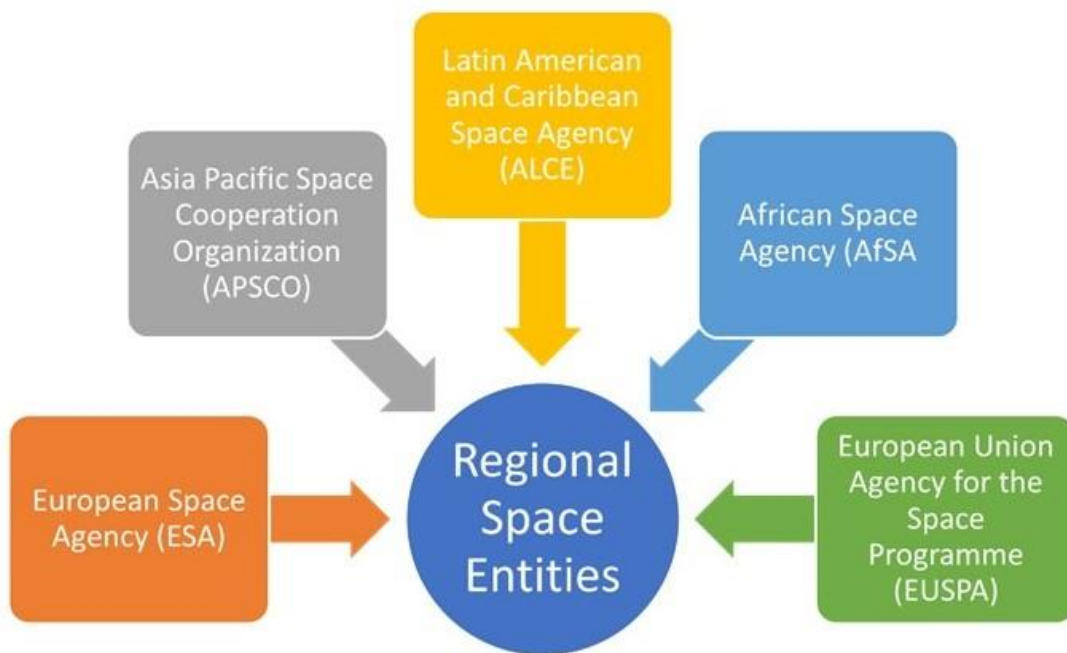


FIG. 5 Regional Space Entities

Final Remarks

The interest of the AU in promoting the development of space capacities has increased over the years. This awareness is clearly expressed in the African Union's commitment to, on the one hand, ensure coordination between all actors and stakeholders; on the other hand, exploit space activities and applications to jointly manage programmes of common interest such as those related to natural resources and the environment; hazards and disasters; weather forecasting (meteorology); climate change mitigation and adaptation; marine and coastal areas, agriculture and food security.

Accordingly, over the years, the AU considered several governance options for implementing the role of the African continent as a space actor. The establishment of the AfSA was deemed as the most suitable option to respond to continental needs. It depicts one of the actions for the institutional governance of space activities in Africa in order to promote and coordinate the implementation of the *African Space Policy and Strategy*, and to conduct activities that exploit space technologies for sustainable development, taking into account users' needs.

As an organ of the AU, the Agency reinforces the role of the Union in the space sector at continental and international levels and its institutional outline has the chance to provide the African continent with a regional and worldwide impact in the space sector.

Efforts are ongoing for making the AfSA operative, and the full and effective implementation of its functions has been underscored in the 2022 Second Continental Progress Report on Agenda 2063. Here, it has been acknowledged that concrete steps forward have been made as regards the structure and costs implication of the AfSA, reviewed by the Sub-Committee on Structural Reforms of the Permanent Representatives' Committee (PRC).¹²³ The AU Executive Council, with Decision 1126 (XXXIX), has approved the structure of the AfSA, facilitating the recruitment of the human resources needed for the operationalization of the Agency. In 2023, the conclusion of the host agreement between the AUC and Egypt marked a further step for the effective governance and coordination of space activities.

¹²³ AU, *Second Continental Report on The Implementation of Agenda 2063*, cit.

5. NORMATIVE GOVERNANCE OF SPACE ACTIVITIES: A PERSPECTIVE FROM AFRICAN COUNTRIES

After the analysis of the regional space governance, this section focuses on the normative governance developed at the national level, which refers to the legal instruments aimed at regulating space activities. The section underscores the range of law and policy acts adopted by African countries for supporting the establishment and realization of their space programmes.

African States and the United Nations Space Treaties

The analysis of the regulatory framework of the space sector in the region must begin with the analysis of the international rules, as to say the UN main space treaties and their acceptance by the African countries.

Starting from the 1960s-1970s, the **process of decolonisation** in Africa led the newly independent States to become members of the UN and **ratify international agreements** on various topics, including those related to the exploration and use of outer space.

The legal framework regulating space activities was carried on within the UN with the adoption of five treaties. The 1967 *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies* (OST) enshrined the basic principles of international space law.¹²⁴ Since then, four other multilateral treaties have been adopted, namely the 1968 *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space* (ARRA), the 1972 *Convention on International Liability for Damage Caused by Space Objects* (LIAB), the 1975 *Convention on Registration of Objects Launched into Outer Space* (REG), and the 1979 *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies* (MOON).¹²⁵

¹²⁴ MARCHISIO S., *Il trattato sullo spazio del 1967: passato, presente e futuro*, in *Rivista di diritto internazionale*, 2018, pp. 205-213.

¹²⁵ UN doc A/AC.105/C.2/2022/CRP.10, 28 March 2022. As of 1 January 2022, 112 States are parties to the Outer Space Treaty, there are 99 States parties to the Rescue and Return

The **acceptance** of the provisions contained in the **UN space treaties** by means of State ratification, brings benefits, rights, and obligations, capable of promoting the consistency and predictability of the international legal system as well as international cooperation in the development of the rule of law for space activities. Moreover, space treaties have **consolidated a legal regime** aiming to foster the exploration and use of outer space and have contributed to create a **safe, secure, and sustainable environment** for the development of space programmes.¹²⁶

In Africa, State's adherence to the UN space treaties has demonstrated to have **strengthen regional and international cooperation**,¹²⁷ and to have ensured **transparency with regard to States' rights and obligations** in conducting space activities.¹²⁸

In this light, some African countries **implemented** UN space treaties' provisions in **national regulatory frameworks**,¹²⁹ consisting of policies, strategies, and domestic space legislation (see *infra*).

Agreement, 72 States parties to the Registration Convention, 98 States parties to the Liability Convention, and 18 States parties to the Moon Agreement.

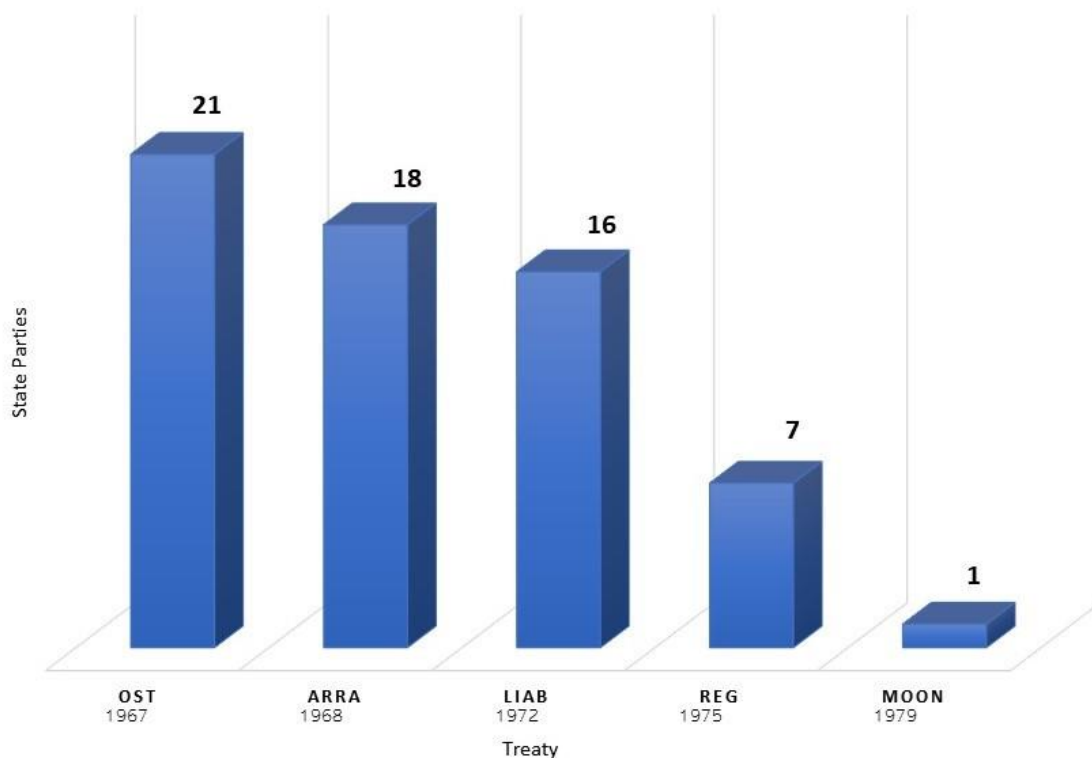
¹²⁶ *Working paper submitted by the Chair of the Working Group on the Status and Application of the Five United Nations Treaties on Outer Space*, A/AC.105/C.2/L.313, 27 January 2020, para. 17-18.

¹²⁷ VAN WYK J.A., *Overview of the Implementation Status of the Five United Nations Treaties on Outer Space in African Countries*, in *African Skies*, 2008, pp. 90-98.

¹²⁸ *Bringing the Benefits of Space to All Countries: a Guidance Document on the Legal Framework for Space Activities*, A/AC.105/C.2/117, 26 January 2022, para. 21.

¹²⁹ *Report of the Legal Subcommittee on Its Sixtieth Session, held in Vienna from 31 May to 11 June 2021*, A/AC.105/1234, 24 June 2021, para. IV.

The Status of the United Nations Space Treaties in African Countries



Status as at February 2023.

As of February 2023, 28 African States have ratified one or more space treaties. As reported in Fig. 5, the OST has the largest number of ratifications *vis à vis* the other space treaties. The acceptance of the OST rights and obligations, however, is not directly connected with the development of national space programmes. Accordingly, of the 21 countries that have ratified the OST, only 11 have undertaken or are developing national space activities, including Algeria, Burkina Faso, Egypt, Kenya, Libya, Mauritius, Morocco, Nigeria, South Africa, Sudan, Tunisia, and Uganda.

On the contrary, a number of countries that are not Parties to the OST have established or identified governmental entities responsible for implementing space programmes, namely Botswana, Djibouti, Ethiopia, Gabon, Ghana, Ivory Coast, Namibia, Rwanda, Sudan, Zimbabwe.¹³⁰

¹³⁰ Gabon and the Ivory Coast have ratified at least another UN space treaty. See Space in Africa, List of Space Agencies in Africa, *cit.*

In line with the global trend, the other UN space treaties have been ratified by fewer States than the OST. Generally, the more the State is involved in space activities, the more treaties will access. For instance, in North Africa, which represents one of the most dynamic African regions for the development of space activities, Egypt, ratified the OST, ARRA and LIAB, while Algeria and Morocco also ratified the REG. Only Morocco has ratified the MOON.

In Western and Southern Africa, Nigeria and South Africa have ratified four of the five space treaties and have adopted domestic space legislation implementing their international obligations.

Some African States have accepted one or more space treaties, as Benin, Guinea-Bissau, Equatorial Guinea, Mali, Togo, and Zambia but without developing national space programmes. Other countries, including Angola, Namibia and Sudan did not ratify any of the UN space treaties but they carry out space programmes as designed in their space policies, implemented through the respective national space offices or commissions.

Lastly, the growing interest in space activities is coupled with an **active participation** of African States to **COPUOS**, that is the main forum for the development of international space law and for enhancing international cooperation in the field of space activities (see *infra*).

STATE	OST 1967	ARRA 1968	LIAB 1972	REG 1975	MOON 1979
Algeria	X		X	X	
Benin	X		X		
Botswana		X	X		
Burkina Faso	X				
Cameroon		X			
Egypt	X	X			
Equatorial Guinea	X				
Eswatini		X			
Gabon		X	X		
Gambia		X			
Guinea-Bissau	X	X			
Kenya	X		X		
Libya	X	X	X	X	
Madagascar	X	X			
Maldives		X			
Mali	X		X		
Mauritius	X	X			
Morocco	X	X	X	X	X
Niger	X	X	X	X	
Nigeria	X	X	X	X	
Senegal			X		
Seychelles	X	X	X	X	
Sierra Leone	X				
South Africa	X	X	X	X	
Togo	X		X		
Tunisia	X	X	X		
Uganda	X				
Zambia	X	X	X		

FIG. 6 Breakdown of African States that ratified at least one UN Space Treaty as at February 2023

The following States have not ratified any UN Space Treaties: Angola, Burundi, Cape Verde, Central African Republic, Chad, Comoros, Congo, Democratic Republic of the Congo, Democratic Republic of São Tomé and Príncipe, Djibouti, Eritrea, Ethiopia, Ghana, Guinea, Ivory Coast, Lesotho, Malawi, Mauritania, Mozambique, Namibia, Sierra Leone, Liberia, Somalia, South Sudan, Sudan, Tanzania, Zimbabwe.

The Involvement of African Countries in the United Nations COPUOS

The development of space activities in African countries has been accompanied by their **engagement in multilateral fora**. This is the case of the COPUOS, which provides an opportunity to participate in the debate on major legal issues, as well as to promote international and regional cooperation initiatives. As of February 2023, 21 African countries are members of the COPUOS:

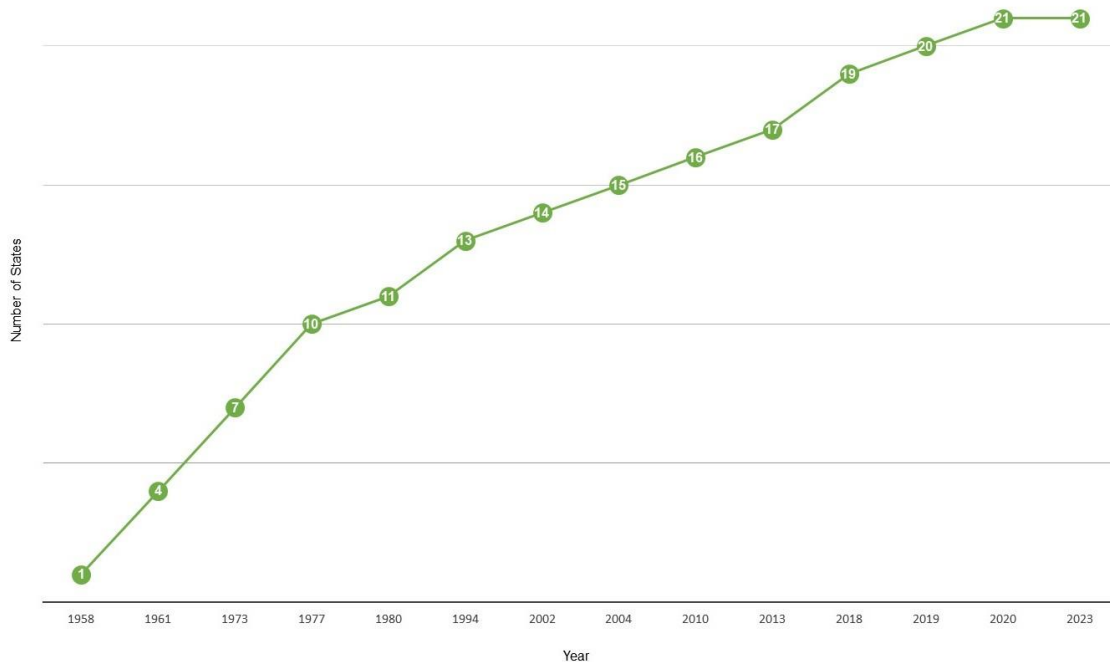


FIG. 7 COPUOS Membership – Africa

COPUOS membership is not linked to the adherence to the UN space treaties. For instance, only 13 African countries are both members of the Committee and parties to the OST, namely Algeria, Benin, Burkina Faso, Egypt, Kenya, Libya, Mauritius, Morocco, Niger, Nigeria, Sierra Leone, South Africa, and Tunisia.

From Policy Objectives to National Space Legislation

Countries establish **national agencies or centres**, develop **space policies and strategies** and adopt **national space legislation** to implement international obligations, support the development of their space programmes and to facilitate regional and international partnerships.¹³¹

The setting up of space policies and strategies, and the establishment of space agencies in emerging space countries is motivated by the following reasons: a) **socio-economic** (developing the domestic space sector to boost national economy and using space data and applications for agriculture, resource management, urbanization, and climate change); b) **coordination** (supporting and facilitating the relations between actors of the space ecosystem); c) **centralization** (combining the activities into a single centralized agency); d) **space diplomacy** (establishing and implementing strategic guidelines, as well as allowing governments to participate in the global space community); and e) **regulatory** (developing a legal framework to manage the space sector and comply with international law).¹³²

The following paragraphs investigate normative space governance by providing a breakdown of African countries carrying out space activities, based on how many and which States have established a national space agency or an entity in charge with space-related matters, how such activities are regulated, and whether such regulation is accompanied by the elaboration of a national space policy or strategy.

Among the 55 African States, 34 are either members of the COPUOS or adhere to at least one of the UN space treaties. As reported in Fig. 8, of these countries, 19 have established (or are in the process to establish) Councils, Commissions, Centres, or Agencies to develop their space programmes, 11 have implemented a national space policy and strategy, and 2 have adopted a national space law.

¹³¹ KNITTEL KOMMEL R., PETER A., PUIG-HALL V., RIESBECK L., *Exploring Insights from Emerging Space Agencies*, The George Washington University, Elliott School of International Affairs, October 2020.

¹³² *Ibid.*, p. 13.

The Creation of National Space Agencies

National space agencies seem to be the preferred model for a **national organizational structure** to deal with space activities. Oftentimes, governments of emerging space nations seek to formalize their space activities through agencies to participate in the global space community and foster stronger international relations. Indeed, the establishment of space agencies enable countries to making clear their goals, strategies and policies and be able to better identify their counterparts in foreign countries and negotiate with each other on equal terms. This partly explains why the number of national governmental space agencies at the global level has been increasing **from 5 in 1970 to around 77 in 2022**.

While a trend towards the institutionalization of space programmes is registered in Africa, only 8 out of 19 **governmental space entities**¹³³ established in the continent are national space agencies, while the other are national secretariats, commissions, research centres etc.

In general terms, the establishment of national space entities seems to be the **first step** towards countries' engagement in the space sector. Indeed, of the 18 countries considered in Fig. 8, there are no countries that adopted a space policy, strategy or national regulation without a standing space entity.

In North Africa, **Egypt** established a National Authority for Remote Sensing in 1991 which was restructured in 1994, following the Presidential Decree No. 261 of 1992, as a **National Authority for Remote Sensing and Space Sciences (NARSS)**¹³⁴. In addition, Egypt has a programme of CubeSats with the series of Narsscube-1, 2, 3, developed by the NARSS and deployed from the International Space Station (ISS). In 2018, the President passed Law No. 3 establishing the **Egyptian Space Agency (EgSA)**, followed in 2020 by the adoption of a 10-year space development plan for the EgSA, focusing on the field of telecommunications.

In the Maghreb area, **Algeria** enacted Presidential Decree No. 02-48 in January 2002 relating to the Creation, Organisation and Functioning of the **Algerian Space Agency (ASAL)**, which was reviewed by Presidential Decree No. 06-189 in May 2006. The Executive Decree No. 04-12 of 2004, as modified by Executive Decree No. 08-348 of October 2008 governs the internal organisation of the Agency. In 2006, the Government implemented a national space programme for

¹³³ Features as of August 2022.

¹³⁴ The organisation aims to promote the use of space technology, in particular Earth observation programmes (EgyptSat) and telecommunications (NilSat).

an initial 15-years period for the development of space applications as EO (Alsat constellation) and telecommunications (Alcomsat) programmes, as well as the development of industrial capacities. In July 2019, Algeria set up its new domestic legislation, **Law No. 19-06**, which specifies that ASAL maintains the **national registry** of objects launched in outer space. The law deals also with the **liability regime in case of damage**. However, the Law does not contain any provision on licence for private operators, as space activities are the sole and exclusive domain of the State (Article 5).

In West Africa, **Ghana** created the Space Science and Technology Institute (GSSTI) that in 2016 turned into the **Ghana Space Agency** (GhSA). The GhSA has the aim of leading the development of the national space programme and coordinate existing space activities in the country, in accordance with the National Science, Technology and Innovation Policy and Development Plan for 2011-2015. Ghana developed a NanoSat programme for Earth observation, GhanaSat-1, launched in 2017 from the ISS in the framework of JAXA/Kibo CubeSat Programme.

In East Africa, States have recently emerged in the space sector, such as Ethiopia and Rwanda. In **Ethiopia**, the Council of Ministers approved the establishment of the **Ethiopian Space Science and Technology Institute and Council** (ESSTI) by Law No. 916/2015 of December 2015. In 2021, it also deployed its first satellite for remote sensing, ETRSS-1, on board a Chinese Long March 4B rocket.

In 2019, Rwanda participated in the construction of two satellites: a) RWASAT-1, launched in partnership with the JAXA, carries a communication payload that collect and forward data to ground tracking stations; b) Icyerekezo, launched in partnership with OneWeb, provides internet access to several remote schools across the Country. In March 2021, the **Rwanda's** Chamber of Deputies established the **Rwanda Space Agency** (RSA). The RSA advises the Government for the creation and development of national space policies and strategies, and it has the responsibility of providing geospatial services for the development of activities in various domains, such as agriculture, urban planning, emergency response and weather forecasts. The Agency has a significant role in capacity-building and education for the setting up of a national space industry. In 2021, Rwanda also submitted a request to the International Telecommunication Union (ITU) to put into orbit nearly 330 000 satellites to support its digital transformation.¹³⁵

¹³⁵ Space in Africa, *Rwanda has submitted ITU filing for 27 orbital shells of 327,320 satellites*, 14 October 2021; ITU, *Rwanda is tackling digital development challenges – and succeeding*, 8 June 2022.

In Southern Africa, **Zimbabwe** created its national space agency, the **Zimbabwe National Geospatial and Space Agency** (ZINGSA), in July 2018, which implements any geospatial space programme in line with the policy determined under the 2001 Research Act (Chapter 10:22). The core focuses of the Agency are the use of EO data satellites, in partnership with the Zimbabwe Geological Survey Department, for wildlife surveillance and monitoring health situation and in particular the Malaria endemic. On 6 November 2022, Zimbabwe launched its first satellite into space, the CubeSat ZimSat-1, as part of the BIRDS-5 constellation.

Space Policies and Strategies

The elaboration of a national policy and a strategy is usually the first step toward the development of domestic regulation. **Space policy** means a governmental policy which defines national goals and issues and that is elaborated to answer the questions “which” and “why” in order to justify the measures adopted to achieve the envisaged goals.¹³⁶ Each policy identifies specific goals, priorities, purposes and a strategy, tailored to the country or the region. In this light, a **space strategy**, is the set of means and timing necessary to achieving the goals defined by the space policy. “What” and “when” are the questions that a space strategy should answer.¹³⁷

States, including Algeria, Angola, Botswana, Egypt, Ghana, Kenya, Morocco, Namibia, Nigeria, South Africa and Tunisia have adopted national policies and strategies guiding the development of their space programmes, even if some of them are not members to the COPUOS or did not ratify the OST or any other space treaty, as Angola and Namibia, while others did not adhere to space treaties different from the OST, such as Botswana which only ratified the LIAB and ARRA.

In Southwestern Africa, **Angola** adopted three Presidential Decrees relating to space activities: a) Presidential Decree No. 101/13 of October 2013, establishing the Interministerial Commission for the General Coordination of the National Space Programme; b) Presidential Decree No. 154/13 (n. 194) of October 2013, establishing the National Space Program Management Office (GGPEN - *Gabinete de Gestão do Programa Espacial Nacional*) and; c) Presidential Decree No. 85/17 of February 2017 implementing the National Space Strategy for 2016-2025. In May 2019, the GGPEN approved its **Strategic Plan of the Management**

¹³⁶ ARRIGO G., *Key Elements of Policy for a Space Ecosystem*, presentation given at *the Global Conference on Space for Emerging Countries – GLEC 2022*, 16-20 May 2022, Quito, Ecuador.

¹³⁷ *Ibidem*.

Office of the National Space Programme 2019-2022 dealing with the objectives and general guidelines of Angola's space activities, especially for the review of the legislative acts governing national space activities. Angola's space strategy focuses on the development of a geostationary communication satellite, AngoSat, with the aim to create an Angola space industry over the longer term.

As for Southern Africa, **Botswana** launched, in December 2020, a **national space policy and strategy in space science and technology** in cooperation with the Botswana International University of Science and Technology (BIUST). The objective is to develop an EO nanosatellites system.

In **Namibia**, the National Commission on Research Science and Technology, through its Space Science Council, issued the **National Space Science and Technology Policy** No. 4/23.03/21/006, in June 2021, for the period 2022-2030. The framework deals with the use of space applications and data for the socio-economic growth of the country. It envisages national, regional, and international collaboration and promotes national capacity building in various fields around space, while creating synergies between government, academia, and industry.

State	Space Agency or Entity	Space Policy	Space Strategy	Space Law
Algeria	X	X		
Angola	X	X	X	
Botswana	X	X	X	
Egypt	X	X		
Ethiopia	X			
Gabon	X			
Ghana	X	X		
Ivory Coast	X			
Kenya	X	X	X	
Libya	X			
Mauritius	X			
Morocco	X	X		
Namibia	X	X		
Nigeria	X	X	X	X
Rwanda	X			
South Africa	X	X	X	X
Sudan	X			
Tunisia	X	X		
Zimbabwe	X			

FIG. 8 African countries normative governance

Sectoral Space Legislation

As space activities become accessible to a wider range of new actors, these are to be conducted in compliance with the space legal framework. **Article VI of the OST** is of particular importance as it represents the basic provision for the conduct of space activities by private entities, by providing that the States shall **authorize and continually supervise** national activities conducted in outer space, including those carried out by non-governmental entities.

In analysing different national space legislation, two categories can be identified: States that have adopted **sectoral space legislation** and States that have adopted a **unitary law**, the scope of which covers all sectors of space activities. In this sense, countries try to strike the right balance between sufficiently detailed regulation and the creation of ‘open’ rules that allow adaptation to any new needs arising from technological development.¹³⁸

Accordingly, this section reports on African countries that have adopted regulations in specific fields of space activities. National space legislation adopted by Nigeria and South Africa is discussed in detail in the following section.

Space applications, especially remote sensing, are particularly relevant for agriculture, the management of natural resources including forests and coastal areas. Hence, some States, such as Gabon, Libya,¹³⁹ Morocco, Sudan and Tunisia have adopted legislation and decrees creating specific centres in the field of Earth observation.

Morocco adopted Decree No. 2-89-520 in December 1989 supplementing Decree No. 2-82-673 of January 1983 relating to the organisation of the National Defense Administration and establishing the **Royal Centre for Space Remote Sensing** (CRTS). It is the main space national entity responsible for the coordination and execution of the national programme for Earth’s observation. It also provides technical advisory services related to space information, and it develops training and education opportunities in space technology and law. Moreover, it ensures access to satellite data resources in the field of EO and navigation through a diversified cooperation at the international and regional levels (e.g., with ESA, EU, NASA, and other international organisations). Another Centre, the **Royal Centre for Space Research and Studies** (CRERS), was created in 2001 to develop Moroccan space technology in various areas, such as remote sensing and communications. With the aim to develop its space capacity, Morocco launched its first remote sensing satellite “Maroc-TUBSAT” in 2001. In 2017 and 2018, it deployed the programme Mohammed VI A & B for EO.

Tunisia adopted in 1984 Decree No. 84-1125 establishing the National Commission for Outer Space Affairs in order to coordinate the country’s use of space-based technologies in areas such as telecommunications (e.g., ArabSat satellite) and remote sensing. In 1988, it created the **National Centre of Cartography and Remote Sensing** by Law No. 88-83, amended by Law No. 2009-24 of May 2009. Tunisia is implementing a national space policy and

¹³⁸ MARCHISIO S., *The Law of Outer Space Activities*, Rome, 2022, p. 221.

¹³⁹ The reference is to the Libya Center for Remote Sensing and Space Science established in 1989.

strategy in order to develop its own space capacity in the field of EO and telecommunication, as well as supporting regional and international partnerships.¹⁴⁰ The country is developing its space capabilities with important partnerships with universities and national institutes to manufacture mini rockets (Almaz 01, Star 01) and nanosatellites (Challenge ONE for telecommunication). Since 1990, Tunis has hosted the **North African States Regional Center for Remote Sensing**, whose members include Algeria, Egypt, Libya, Mauritania, Morocco, Sudan, and Tunisia, as well as the Sahara and Sahel Observatory.

In West Africa, **Gabon** established the **Agence Gabonaise d'Etudes et d'Observations Spatiales** (AGEOS) in 2010. In March 2015, Decree n°0205/PR/MENP fixed the tasks, organisation, and functions of the Agency. Gabon's vision is to improve access to space data on the continent in order to meet the needs of the end users. AGEOS uses satellite imagery to develop applications in the fields of forestry, agriculture, and urban planning. The country participates to the programme GMES&Africa.

In North-eastern Africa, **Sudan** created its **Remote Sensing Authority** (RSA) in 1977, as a National Remote Sensing Center within the National Council for Research, Ministry of Higher Education and Scientific Research. RSA conducts research and development in the field of remote sensing and navigation technology applications for natural resources, environment, and disaster management. It also provides policy recommendations to the government. Besides remote sensing activities, Sudan established in 2013 the Institute of Space Research and Aerospace (ISRA) to develop training programmes and building capacity in satellite technology. In 2019, Sudan launched its first satellite, SRSS-1, for Earth observation.

Unitary Law: South Africa and Nigeria

Nigeria and South Africa can be considered as case studies of the **promising African space sector**. South Africa first adopted a national space legislation in 1993 without having really developed space programmes and then it created its space agency in 2008. Nigeria established its space agency in 1999 and adopted its national space legislation in 2010. Their paths have been different, albeit both succeeded in establishing firm national space ecosystems.

The analysis of the legal framework, i.e., the elements considered in Fig. 9, is based on the recommendations of **Resolution 68/74, Recommendations on**

¹⁴⁰ For instance, China has established the first overseas Beidou Satellite Centre in Tunis. The Centre aims to strengthen cooperation in satellite navigation between China and the Arab nations.

National Legislation Relevant to the Peaceful Exploration and Use of Outer Space, agreed per *consensus* by the COPUOS and adopted by the General Assembly on 11 December 2013, containing the guiding elements for drafting national space legislation. These include: a) the **scope of space activities** covered by the law; b) **national jurisdiction** over space activities carried out from a State's territory under its jurisdiction and control; c) **authorization** by an appropriate national authority that has the competencies to grant, modify, suspend and revoke the authorization; d) **conditions for the authorization and licensing** depending on national activities conducted by States and non-governmental entities; e) the conditions for authorizations which should reflect the **national security and foreign-policy interests of States**, ensure that space activities are carried out in a safe manner and do not lead to harmful interference with other space activities; f) procedures for ensuring the **continuous supervision and monitoring** of authorized space activities; g) the establishment of a **national registry** of objects launched into outer space; and h) **insurance requirements and indemnification procedures**.

Follows that a space activity will be only authorized when it meets requirements referred to two categories: a) **general criteria**, considering States' interests, international obligations and security matters; and b) **specific criteria** dealing for instance with insurance, indemnification procedures, technical and financial capacities, and protection of the environment.

As an example, the national space legislation of Nigeria and South Africa provide for the designation of a competent national authority to grant authorisation and licences (under certain conditions), as well as ensure procedures for continued supervision over their national space activities.

South Africa

Overview

South Africa represents a major actor in the space field, with the establishment in 1841 of a Magnetic Observatory operating at the University of Cape Town. The Observatory joined an international network of observatories as part of the International Commission for the Polar Year in 1932. It was then involved in several international space science events, which culminated in the first South African Antarctic Expedition (SANAE 1) in 1960. ("About - SANSA") The same year, the facility at Hartebeest Hoek became one of the NASA's 14 Satellite Tracking and Data Acquisition Network (STADAN) stations established around the globe. In more than 50 years of operations, the facility has overseen hundreds of launches and provided continuous Telemetry, Tracking and Command (TT&C)

services for polar orbiting and geostationary satellites to space agencies and aerospace companies around the globe.

South Africa represents an **industrial hotspot** of Africa's space ecosystem. Since the early days, the space industry has grown through key phases of development, promoted by the proactive engagement of the government. The South African commercial space industry features collaboration and support between the three major actors: a) academic institutions (e.g., Space Lab of the University of Cape Town), b) government and c) private sector.¹⁴¹ Hence, South Africa has a variety of entities that form its space ecosystem for the exploration and use of outer space.

National Space Legislation

In 1993, South Africa adopted the **Space Affairs Act No. 84**, amended in 1995 with the Space Affairs Act No. 64. This establishes the South African Council for Space Affairs (Section 4) and refers to "the activities directly contributing to the launching of spacecraft and the operation of such craft in outer space" (Section 1, xix). The Act addresses the question of responsibilities of the State for national activities (Section 5), liability of the licensee for damage (Section 14), as well as the issue of limitation of State's liability or any person employed by the State in respect of actions undertaken under the Act in good faith and without negligence (Section 21). It details the conditions to obtain a licence delivered by the South African Council for Space Affairs (Sections 11 and 12), which can amend, suspend, or revoke a licence (Section 13). The Council may designate an inspector to ascertain that the authorisation conditions are being complied with the licensee (Section 10). The Council maintains the national registry of space objects.¹⁴²

The Act has a broad scope of application, and it covers the systems of authorization and liability. The authorization procedure is regulated by Section 11 which provides that a **licence** is delivered for any launching from the territory of South Africa, any launching from the territory of foreign State by or on behalf of a 'juristic' person registered in South Africa; the operation of a launch facility; the participation by any 'juristic' person incorporated in the country involved in space activities entailing obligations to the State in terms of international convention or

¹⁴¹ For instance, the Cape Town-based SCS Aerospace Group, founded in 2008, represents a conglomerate of four South Africa's largest space companies. It leads the private sector commercial space front in South Africa. The SCS group includes the Space Advisory Company, SCS Space, NewSpace Systems, and Space4Development.

¹⁴² *Note verbale dated 11 July 2012 from the Permanent Mission of South Africa to the United Nations addressed to the Secretary-General, ST/SG/SER.E/INF.27, 11 July 2012: "The focal point for the national registry is the South African Council for Space Affairs".*

which may affect national interests; any other space-related activities prescribed by the Minister. Safety standards, national interests, international obligations, and responsibilities of the country are elements taken into account in the delivery of the licence. Section 13 specifies the **conditions for amending and revoking the licences**. In particular, the section refers to the violations of the conditions on whose basis the licence has been granted and to possible situations of conflict interests with the State. Section 14 states that a licence must contain the conditions relating to the **liability** of the licensee for damages and the cases of limitation or exclusion of the liability of the licensee regarding damages that may be caused by a launch vehicle or spacecraft.

Besides the Space Affairs Act, there are other legal instruments relevant to carry on space activities at national level. In 2003, South Africa adopted its **Spatial Data Infrastructure Act No. 54** in order to provide for the determination of standards and prescriptions about the facilitation of the sharing of spatial information, and to provide for the capture and publishing of metadata and the avoidance of duplication of such capture.

In 2005, the country also adopted the **Electronic Communications Act No. 36** (ECA) to promote convergence in the broadcasting, signal distribution and telecommunications sectors and to provide the legal framework for convergence of these sectors, to make new provisions for the regulation of electronic communications services, electronic communications network services and broadcasting services, to provide for the granting of new licences and new social obligations, as well as for the control of the radio frequency spectrum.

In 2007, the South African Government adopted the **Astronomy Geographic Advantage Act No. 21** to preserve and protect the areas within the Republic that are uniquely suited for optical and radio astronomy and to provide for intergovernmental cooperation and public consultation on matters concerning nationally significant astronomy advantage areas.

The following year, the adoption of the **South African National Space Agency Act No. 36** mandated the formation of the South African National Space Agency (SANSA), which went operational as officially launched in 2010. The Act provides for the promotion and use of space and cooperation in space-related activities, foster research in space science, advance scientific engineering through human capital, support the creation of an environment conducive to industrial development in space technologies within the framework of national government policy. This should be pursued through the work of the SANSA, which has to establish any programme in line with the national space policy and cooperate with space-related agencies of other countries. The Act has been amended in 2014

and 2020 respectively by the Science and Technology Laws Amendment Act No. 7 and 9.

Following the creation of the SANSA, the country released in 2008 its national space policy and strategy, identifying three priority areas: environment and resource management; health, safety, and security; and innovation and economic growth. The strategy focuses on the necessity to foster and promote innovation and industrial competitiveness, with the development of the local private space science and technology sector.

Space Capabilities

South Africa operates through the SANSA in **four programme areas**: EO with data archive and catalogue aiming at providing users in Southern Africa with easily discoverable and accessible satellite data and the development of nano and small satellites (e.g. Kondor-E, nSIGHT-1, SumandilaSat); Space Engineering (industry and facility development); Space Operations (Antenna Services, Launch Support Services, TT&C Services and Teleport services); and Space Science (Space Weather Centre and Magnetically Clean Facility).

Regarding access to space capabilities, satellite SumandilaSat, launched in 2009 and operated until 2011, is emblematic as it was designed, built, and tested in South Africa by 40 local companies,¹⁴³ illustrating the capability of the country to autonomously support its national space programme. This successful collaboration demonstrates also a nascent commercial space industry era in the country.

Nigeria

Overview

Nigeria is one of the African nations that beforehand recognized the importance of space science and technology for national development. Nigeria first stated its space ambition at an intergovernmental meeting of the ECOWAS and of the OAU in 1976.¹⁴⁴ In 1988, the National Council of Ministers approved the establishment of a National Centre for Remote Sensing. In 1999, the Government established the **National Space Research and Development Agency (NASRDA)**, with the aim to develop a Nigerian space programme. In 2003, Nigeria procured the launch of its first satellite, NigeriaSat-1, an EO satellite that became part of the

¹⁴³ University of Cape Town, Space Lab, *Space in South Africa*.

¹⁴⁴ *Articulating a New National Space Policy for Nigeria*, in BusinessDay, 11 July 2022.

international Disaster Monitoring Constellation (DMC).¹⁴⁵ Since then, Nigeria has launched a total of five satellites, including NigeriaSat-X, designed, and built by engineers from Nigeria. NASRDA manages the national space programme and policies and operates through various sub-centres and laboratories around the country. These centres include the Centre for Basic Space Science (CBSS), Centre for Satellite Technology Development (CSTD), Centre for Atmospheric Research (CAR), the African Regional Centre for Space Science and Technology Education (ARCSSTEE), Centre for Geodesy and Geodynamics, and National Centre for Remote Sensing. In particular the NASRDA, through the CSTD, undertakes missions related to research and development in all aspects of satellite technology, including development of satellite payloads for EO, communication and science applications; capacity building in collaboration with foreign and local institutions; command and control of satellites in orbit and downloading and processing of imagery and other data; creation of awareness and public enlightenment through workshop and conferences.

National Space Legislation

NASRDA was established with the objective to pursue the development and application of space science technology for the socio-economic benefits of the country. In May 2001, the Federal Government approved the **National Space Policy and Programmes** to actualize the country's space agenda.¹⁴⁶ The Policy aimed to achieve autonomy in the development of space technology, and in the utilization of space-derived data and products. The purpose was to stimulate the following areas: space science and technology, remote sensing, satellite meteorology, communication, and information technology, as well as defence and security.

Following the adoption of the space policy, a **Strategic Roadmap to Space** was planned for the period 2005-2030. It is a programme tailored towards achieving the development of space science and technology in the country through research and development, capacity-building in the fields of engineering, space science, law, and administration for a sustainable national development. The Programme deals with various aspects in order to sustain the development of Nigerian space sector: *a)* launching of satellites NigeriaSat, *b)* training of Nigerian

¹⁴⁵ The Disaster Monitoring Constellation (DMC) is a unique Earth observation satellite constellation that delivers high frequency imaging anywhere on the globe from a long-established collection of satellites built by Surrey Satellite Technology (SSTL) and which are each independently owned and controlled by a DMC Consortium member (Algeria, Turkey, Nigeria, China, UK).

¹⁴⁶ Aerospace Security, Center for Strategic and International Studies, *Challenges and Opportunities of Nigeria's Space Program*, 24 June 2020.

Astronauts, c) development and building of “made in Nigeria” satellites, rockets and propulsion systems, d) large scale commercialization of space technology and know-how, and e) by 2030, the launch of Nigerian satellites from the Nigerian Launch Pad. This ‘roadmap’ requires the development of systems and facilities that need to be supported by the space agency, industries, and government through appropriate investments for private entities.

In August 2010, Nigeria adopted the **NASRDA Act**. It formally established the National Space Research and Development Agency, empowering the National Space Council as the regulating and supervisory entity for space activities in Nigeria. By virtue of the Act, the National Space Council provides a **system of licences** for remote sensing and satellite data in Nigeria, thus limiting the scope of application of the law. The licence is granted if the activity does not jeopardize public health or the safety of persons or property. Moreover, it shall be consistent with the international obligations of Nigeria and shall not impair the State’s national security (Section 6k). In addition, a licence **describes the activities authorized**, including the permit to inspect and test the facilities and equipment, and requires the licensee to conduct operations in such a way as to avoid breaches of any international obligations of Nigeria.¹⁴⁷ The licence shall also be issued on the conditions that the licensee provides information to the Council concerning the nature, conduct, location, and **results of the licensee’s activities**. In addition, an explicit function of the Agency is to implement strategies for **promoting private sector participation** in the space industry, establishing a platform for Private Sector Participation (PSP) [Part II - Section 6 (e)] referring to the Agency’s power to grant licences to body corporate (Section 9). Moreover, the Agency maintains a **register of space objects** [Part III - Section 10 (1)].

The Act specifies that space operations have to be conducted in such a way as to **prevent the contamination of outer space** or cause any adverse changes in the environment of the Earth, to **avoid interference** with the activities of other States involved in the peaceful exploration of outer space and, to govern the disposal of the payload in outer space on the termination of operations.¹⁴⁸ NASRDA, as the national space agency, has a key role in shaping the Nigerian space ecosystem. In particular, NASRDA, on behalf of Nigeria, is a member of the ALC Conference,¹⁴⁹ which plays a major role in space science, technology, and innovation in Africa.

¹⁴⁷ The Act requires the licensee to insure himself against liability incurred in respect of damage or loss suffered by third parties in Nigeria or elsewhere as a result of the activities authorized by the licence (Section 9f).

¹⁴⁸ Compendium of space debris mitigation standards adopted by States and international organizations, 28 March 2022.

¹⁴⁹ See Section 2.

In May 2022, the enactment of the **Regulation on Licensing and Supervision of Space Activities** marked a key milestone.¹⁵⁰ The Regulation, alike the NASRDA Act, empowers the Agency to grant licences in all sectors of space activities in Nigeria. The scope of application of the act is extended with respect to launch operations and activities in orbit. The Regulation creates an independent Directorate of Regulation, Licensing and Supervision of Space Activities, under the supervision of NASRDA, to drive and consolidate the system of licence, liability, and insurance for the development of national space activities.

The Regulation applies to (i) corporations registered in Nigeria; (ii) operators, as well as manufacturers of space objects and launch vehicles within Nigeria territory or to which Nigeria is a party (Part I, Sections 1 and 2). The Regulations provides **four categories of licenses** for launching activities, including the construction and operation of a launch facility by a Nigerian person or entities (Part 2), launch permit (Part 3), and overseas launch certificate (Part 4); as well as for the conduct of space activities (Part 1). The conditions to be fulfilled in order to obtain the license are the same as in the 2010 Act. In addition, the licensee must demonstrate **financial capability** to undertake such a space activity and **technical knowledge** (Section 6). The following elements are considered in the Act (Part I): compliance with **ITU Regulations** (Section 6), conditions in case of **transfer or revocation of the license** (Section 8), protection of space environment (section 9), **mitigation of space debris** (Section 10), and **insurance requirements for the operator** (Section 39).¹⁵¹

Space Capabilities

In terms of space capabilities, **NASRDA owned, operated, and managed three satellites**, namely NigeriaSat-1 (2003-2012), which had significant applications for managing natural disasters during hurricane Katrina in the United States, and the Tsunami in Southeast Asia, NigeriaSat-2 (2011-2018) and NigeriaSat-X

¹⁵⁰ 2015 Regulation on Licensing and Supervision of Space Activities (Vol.108, No.106, of 28th September 2021, Government Notice No.158, Page 3 B4209-4235); see also Space in Africa, *NASRDA Signs MoU with OAL for Space Regulation*, 4 May 2022: “The National Space Research and Development Agency (NASRDA) has signed a Memorandum of Understanding with a law firm, Olisa Agbakoba Legal (OAL), on the regulation and licensing of space activities. It followed the enactment of Regulation on Licensing and Supervision of Space Activities. The regulation empowers NASRDA to license all space activities in Nigeria”.

¹⁵¹ Section 39 requests the operator to hold an insurance policy to the sum of at least \$15,000,000 for possible damages caused to third parties. Moreover, a person shall indemnify the government against any claim. The person or entity to indemnify the Government in respect to damage caused by its space activities may pay an amount not exceeding the cap of \$15,000,000 (Section 40). Lastly, the Act precises that the Council may appoint an inspector to monitor the activities authorized under the Regulation.

(2011-2016). Today, NigComSat1-R (2011-2026) is owned by the NASRDA, but it is operated and managed by the Nigeria Communication Satellite Ltd (NigComSat), which has been created under the auspices of the Federal Ministry of Communication Technology. In September 2021, the Nigeria government set up two new satellite companies, Satellite Infrastructure Company (SIC) and the Satellite Broadband and Broadcasting Company (SBBC), from the NigComSat.¹⁵² Although the government continues to play a primary role in the space domain, the economic growth of the country depends also on the private sector and start-ups (e.g., Telnet) that attract investments from local institutions and international investors.

¹⁵² *Nigeria Sets Up Two New Satellite Companies*, in *Premium Times*, 21 September 2021.

Legal Framework*	State	
	Nigeria	South Africa
Material scope of application	X	X
Ascertainment of national jurisdiction over space activities	X	X
Authorisation by a competent national authority	X	X
Conditions for granting authorization	X	X
Supervision of space activities	X	X
National Registry of Space objects	X	X
Recourse mechanisms	X	
Transfer of ownership or control of objects in orbit		

FIG. 9 Elements of the Nigeria and South Africa National Space Law

* The elements considered are those included in UNGA Resolution 68/74, *Recommendations on National Legislation Relevant to the Peaceful Exploration and Use of Outer Space*, 11 December 2013.

A case study: Kenya

Considering the purposes of the OSL Project, which provides the basis for collaboration and mutual support between the Sapienza and KSA teams, the following paragraph gives an insight on the Kenya space sector and its regulatory framework.

Overview

Kenya started its journey in space with the establishment, in the 1960s, of the Italian **San Marco-Malindi** launch and tracking station in its territory (see *infra*). From there, over twenty sounding rockets and nine satellites were launched between 1967 and 1988. By hosting this space base, Kenya realized the potential of space activities for national development and set up its own facilities. The establishment of the Centre was followed by the building of the **Longonot Earth Station**, which became operational in 1970 and provided international satellite communications to the entire East African Community, and other Earth stations in Kericho and Nairobi. Today Earth stations are present in the country, including submarine cables that facilitate international communications.

Space activities in Kenya have grown rapidly in the last decades, with the country committed to the development of a national space sector. Through investments in training and space research, Kenya has become **both a user and a developer** of space applications, especially oriented towards national development targets in the long-term. Indeed, space activities are considered essential to provide straightforward support for the achievement of the country's development goals included in the **Kenya Vision 2030**, a development blueprint covering the period 2008 to 2030 that aims to transform Kenya into a **newly industrialising**, "middle-income country providing a high-quality life to all its citizens by the year 2030"¹⁵³ with a view to sustainable development.

Kenya Vision 2030

The Vision is a product of a highly participatory, consultative, and inclusive multi-stakeholder process carried out between October 2006 and May 2007, then subjected to open consultations in all provinces in Kenya before the document was finalized.¹⁵⁴ This development programme is articulated in **four pillars** that take into account the multi-dimensional nature of development. The **economic pillar** aims to achieve an average economic growth rate of 10 per cent per annum and sustain the same until 2030; the **social pillar** seeks to engender just, cohesive and equitable social development in a clean and secure environment; the **political pillar** intends to realize an issue-based, people-centred, result-oriented and accountable democratic system. The **fourth pillar**, titled Enablers and Macros, contemplates the foundations to which the economic, social, and political pillars of *Kenya Vision 2030* are anchored, namely macroeconomic stability; infrastructural development; Science, Technology, and Innovation (STI);

¹⁵³ *Kenya Vision 2030*, 10 June 2008.

¹⁵⁴ Sessional paper No. 10 of 2012 on Kenya Vision 2030.

Land Reforms; Human Resources Development; Security and Public Sector Reforms.

The content of the *Kenya Vision 2030* is **in line with the African development agendas**, notably *Agenda 2030*, by including infrastructure, health, manufacturing, affordable housing, food and nutrition and security among the development areas. A core issue is sustainable development, For instance, sustainable agricultural production features in both *AU Agenda 2063* and *Kenya Vision 2030*, and equally seek to promote environmental rule of law, which is central to sustainable development. At the national level, the Constitution of Kenya adopted in 2010 and other post Constitution statutes and policy documents recognise the centrality of sustainable development.

Overall, the overlap between national and regional development targets, as well as the synergy of national and regional efforts, is beneficial to their effective implementation at both levels and for the achievement of targets under the UN Agenda 2030 on Sustainable Development.

The *Kenya Vision 2030* is to be implemented through successive five-year medium-term plans. Under the **Third Medium Term Plan (MTP III) 2018-2022**, themed *Transforming Lives: Advancing socio-economic development through the “Big Four”*, Kenya is pursuing the **“Big Four” Agenda**, which seeks to promote: a) industrialization, manufacturing and agro-processing; b) affordable housing; c) food and nutrition security; and d) universal health coverage. The Big Four are conceived for accelerating the achievement of the Vision 2030 aspirations, focusing on raising the standard of living of Kenyan citizens.

In working towards the Big Four, MTP III also mentions **space technologies as relevant tools for national development** and recognizes the importance of the establishment of the national space agency in optimizing the use of space activities for this purpose. In addition, MTP III's Flagship Projects include the Space Science Technology Development Programme, aimed at enhancing the teaching, research and development of space science and subsequent use of space technology for peaceful purposes. In fact, Science, Technology, and Innovation (STI) play a pivotal role in industrialization, sustainable development, and economic growth. Investments and integration of STI into social, economic and governance policies is expected to increase Kenya's global competitiveness, create employment, and enhance productivity, in line with the *Kenya Vision 2030* and the Constitution, that explicitly place a premium on the generation and management of a knowledge-based economy and the need to raise productivity and efficiency.

The Institutional Governance of Space Activities

The Government of Kenya, recognizing the potential impact of the space sector on a wide spectrum of the country's socio-economic needs, decided to create a body to coordinate space-related activities as part of the initiatives promoted to implement the *Kenya Vision 2030*. In this line, the Office of the President, on 5 June 2009,¹⁵⁵ established the **National Space Secretariat** (NSS) under the coordination of the Department of Defence.

The Secretariat, chaired by the Principal Secretary, was composed of stakeholding Ministries and Institutions in space-related disciplines and had a leading role in the promotion and enhancement of social and economic development by using space technology. "In 2014, the Ministry of Defence set up an Inter-Ministerial Committee coordinated by the NSS".¹⁵⁶ In line with its mandate, the Committee drafted the National space policy and strategy. A key policy recommendation was the need to establish a national space agency, whose mission would that of promoting, coordinating and regulating space-related activities in the country, replacing the NSS. Along these lines, the institutional governance of space activities in the country has undergone a progressive transformation.

In 2017, the **Kenya Space Agency** (KSA) was created by President Uhuru Kenyatta acting under Sec 3 (1) of the State Corporations Act, through the Kenya Space Agency Order.¹⁵⁷ The 2017 Order has qualified the Agency as a State Corporation, i.e., a body corporate where the Government controls the shares, under the ministerial responsibility of the Defense Cabinet Secretary. The Agency's primary role is to enhance coordination between government, commercial and academic organisations pursuing space activities as well as to implement Kenya's space policy and programme, and in particular the *Kenya Space Agency Strategic Plan 2020-2025* adopted in October 2020.

The latter is a policy framework dedicated to transforming the country's involvement in space activities, by developing capabilities that will catalyse the growth of industries critical to the country's economy. In implementing the Plan, KSA strives to promote access and effective utilization of space economy for achieving national sustainable development, with the mission to coordinate, nurture and develop Kenya's space sector to maximize the benefits from space applications.

¹⁵⁵ Gazette notice 5563.

¹⁵⁶ *Highlights of the Launch of Kenya Space Agency Strategic Plan 2020-2015*, in Space in Africa, 21 October 2020.

¹⁵⁷ Kenya Space Agency Order, Kenya Gazette Supplement No.24, 7 March 2014.

The Plan deals with three fundamental pillars for future Kenyan development: political, social, and economic. The Plan includes also four main commitments for the enhancement of the mentioned pillars: a) strengthening the coordination of the space sector to increase its contribution to Kenya's socio-economic development; b) supporting the development of systems and applications to enhance the uptake and utilization of space derived data and information for decision making; c) developing and adopting requisite legislation in support of the growth of the space sector and development of space related technologies; d) intensifying capacity development and outreach programmes to increase the number of practitioners and inspire the next generation of professionals in the space sector.

Space Projects

Since 2018, Kenya has been involved in several projects on space activities. In 2018 and 2021, Kenya participated in the UNOOSA/JAXA KiboCube cooperation programme, deploying two EO small satellites, 1KUNS-PF and WildTrackCube-SIMBA, from the ISS. In 2021, Egypt, Kenya and Uganda were selected to join the UNOOSA/Airbus-Bartolomeo programme "Climcam" in order to develop a remote sensing camera to monitor weather, floods, and climate change. The country is also taking part in the "BARIDI SANA – High-Performance Micro 2-Phase Cooling System for Space Applications" project aboard the China Space Station. In February 2023, a Consortium led by the University of Nairobi has been awarded within the UNOOSA *Access to Space for All* initiative to launch a CubSat onboard a Vega C launcher.

Kenya benefits as well from the joint opportunity ISONscope, a programme which supports capacity building and promotes space education and research in developing countries. Through the programme, UNOOSA and the Keldysh Institute of Applied Mathematics of the Russian Academy of Sciences (KIAM RAS) award small telescopes to research institutions and agencies, aiming to increase national capabilities in astronomy and space data analysis.

Lastly, Kenya cooperates with Egypt, Nigeria, Ghana, Uganda and Sudan to the African Development Satellite Initiative (AfDev-Sat), a pan-African satellite project aiming to develop a space system for climate change monitoring and capacity building.

Domestically, KSA is developing a space network that will provide real-time monitoring of space weather events, which will, in turn, mitigate against adverse conditions in the space environment.

Other projects include the rollout of the Global Learning & Observations to Benefit the Environment (GLOBE) one. It is an outreach programme to promote and sustain interest in Science, Technology, Engineering, and Mathematics (STEM) subjects, which are foundational for careers in Space Science and Technology. The KSA is also building up a Satellite Imagery Analysis Portal which is an Open-Source Geospatial Data Management & Analysis Software that will support the needs of satellite data users.¹⁵⁸

Finally, the KSA website features the Africa Regional Data Cube (ARDC), a platform that contains 17 years of satellite imagery and is currently available for five countries in the continent, including Kenya itself, Ghana, Senegal, Sierra Leone, and Tanzania.¹⁵⁹

Final Remarks

The study showed that in Africa the establishment of national agencies and space governmental entities is the first step to engage in the sector and provide support for the development of national space programmes, as well as facilitate regional and international partnerships. Then, a general trend is the adoption of space policies and strategies, for illustrating the space 'vision' of the country and meeting national needs and requirements.

With regard to national space regulation, African States have adopted different approaches shaped according to national needs and to the degree of involvement of the private sector. Some States uphold a sectoral approach, setting up targeted provisions for specific fields of space activities (e.g., remote sensing) and for creating centres or agencies, while others have implemented unitary space legislation, i.e., Nigeria and South Africa.

Finally, a case study on Kenya showed that the Government's commitment in both dimensions of space governance, institutional and normative, has allowed the sustainable development of the national space ecosystem, standing today as a relevant example in the landscape of emerging space countries. Notably, after having created the national space agency, the country adopted the Kenya Vision 2030 and the Kenya Space Agency Strategic Plan 2020-2025, while the process to adopt a national space law is ongoing.¹⁶⁰

¹⁵⁸ *The Kenya Space Program – An Analysis of the National Agency's Strategic Plan*, in Space in Africa, 19 November 2020.

¹⁵⁹ *Ibidem*.

¹⁶⁰ KSA, *Kenya Space Policy & Bill 2023 Review Workshop*, 22 November 2022

Overall, the enactment of domestic space legislation represents a tool to support and to assist the growing development of national markets, as well as to attract investments as they provide predictability in the conduct of space programmes. However, these norms should not be too restrictive and there should not be an over-regulation of a nascent sector in order to allow the establishment of space ecosystems in African countries, involving government, private entities, and the civil society.

6. AFRICA-EUROPE INTERNATIONAL SPACE COOPERATION

The institutional and normative governance of space activities are two core elements for building a mature space ecosystem. However, the complexity of space programmes often implies the involvement of a wide range of actors and the engagement in international partnerships and collaborations. In this light, the section provides an overview of the Africa-Europe international cooperation on space activities, by considering the cooperative programmes conducted by the European Space Agency (ESA) and the European Union (EU), as well as the bilateral cooperation between African and European countries.

Overview

The **long-standing relations** between Europe and Africa in multiple fields extends also to the space sector. As in other areas of cooperation, such a relationship reveals a dynamic history that mirrors an intricate array of national, regional, and international interests and strategies. This reflects on the one hand, the composite European space governance, characterized by the simultaneous actions undertaken by the European Union and the newly established EU Agency for the Space Programme (EUSPA), the ESA and the EU/ESA Member States that adopted national space programmes. On the other hand, such relations support the evolution of the African space landscape and the progressive interest of African countries towards forms of international cooperation in the space sector.

On the European side, the bilateral relations between European and African States are located within larger forms of cooperation that are conducted within the ESA and the EU frameworks.

The European Space Agency Programmes in Africa

The areas of cooperation between ESA and Africa in the space sector originally referred to **space science** and **astronomy**; then extended also to include **EO**, **satellite communications**, and **navigation and positioning**.¹⁶¹

¹⁶¹ Efforts in furthering knowledge and experience of space applications in developing countries, including Africa, witnessing the involvement of European countries (coordinated within ESA)

Early forms of multilateral cooperation between Europe and African countries, parallel to the bilateral cooperation carried on by European States, began in 1975 with the establishment of the ESA.

In a **first phase**, between 1975 and 1990, international cooperation with African countries was instrumental to ESA's needs for **infrastructure**, i.e., downrange stations for launchers and deep space stations for its meteorology and telecom programmes.¹⁶²

In a **second phase**, ESA began to develop its cooperative programme by conducting activities in support of challenges faced by States across consistent regional areas, including Africa. For instance, under the **"Space for Earth"** initiative, ESA carries out activities within selected regional areas. These areas are consistent regions, where States are facing similar challenges or share specific interests, and ESA Member States support a coordinated approach.¹⁶³

In addition, the Agency has diversified its engagement with emerging space nations by exploring other means of support, for example through relevant international organisations. In this context, on 24 May 2019, the ESA and UNOOSA signed a Memorandum of Understanding for the realisation of a **Space Solutions Compendium (SSC)** within a broader programme "to cooperate on helping all countries identify how space can sustain their efforts to reach the UN SDGs, with a view to facilitate access to space solutions and with particular attention to developing countries."¹⁶⁴ The SSC is still being implemented and is based on the information already contained in the ESA Sustainable Development Goals Catalogue (**ESA Catalogue**) established in 2018 and of interest for integration into the SSC. At the request of ESA Member States, Africa has been selected as a regional area for implementation of the support to the SDGs. In particular, the Catalogue will be used to identify existing space activities relevant to Africa.

commenced in the late 1980s, when discussions among developing countries, the UN and the ESA, identified the possible need and importance to support the growth of small research groups in universities and research establishments in the developing countries in the field of astronomy and space science. This led to the holding of the UN/ESA Workshops on basic space science on an annual basis in the different regions, including Africa.

¹⁶² An international agreement was for instance concluded between the ESA and Gabon in 1986 for the establishment of an Ariane downrange station in its territory. European Space Agency, *Agreement Between the Gabon Government and the Agency on the Setting-up and Use of an Ariane Downrange Station at Libreville*, 6 October 1986.

¹⁶³ The geographical areas covered by the initiative are Africa, "Blue Worlds", Arctic and Antarctic, while the themes currently covered under the initiative are Health, Sustainable Development and Migration, and Energy.

¹⁶⁴ UNIS/OS/511, 24 May 2019.

The Legal Framework for EU-AU Cooperation in Space

As for the EU space cooperation with African countries and continental institutions, two main factors led to its establishment and evolution. On the European side, this was the result of the progressive strengthening of the EU competences in the scientific and technological research fields and the attribution to the EU of an explicit competence in the space sector following the entry into force of the Treaty of Lisbon on 1 January 2009; on the African side, the establishment of the AU and its role as interlocutor for the continent at the international level, including in space-related matters since 2010.

Indeed, African countries, like their European neighbours, have been steadily pursuing political and economic integration for decades. Since the foundation of the OAU in 1963, and even more so with the creation of the AU in 2002, pan-Africa institutions' ambitious policies and initiatives have been driving development and integration on the African continent in many key areas, including space activities.

The EU-AU cooperation in the space sector has been taken place since 2007 within the framework of the **Joint Africa-Europe Strategy** (JAES) adopted at the Lisbon Summit, which brought together the then Leaders of the 27 European and 54 African States, as well as the representatives of the two organisations. It outlines a **long-term, shared vision** for the future of Africa-EU relations while defining priorities, notably related to climate, environment, and space.

The JAES brought significant new elements to the Europe-Africa cooperation as per its scope and territorial coverage. First, it shifted the historical development-focused relationship between Europe and Africa to a **partnership of equals**, mutual interests, and shared responsibility. Furthermore, it extended the scope of the previous cooperation based on the Cotonou framework for sub-Saharan Africa¹⁶⁵ and the neighbourhood policy for North Africa by establishing a strategic partnership with the **African continent**.

The JAES structured Africa-EU cooperation in **different partnerships**, with Science Technology and Innovation (STI) grouped together with information and communication technologies (or the information society) and Space in the so-

¹⁶⁵ *Partnership agreement between the members of the African, Caribbean and Pacific Group of States of the one part, and the European Community and its Member States, of the other part, 2000/483/EC, Cotonou, 23 June 2000.*

called Eighth Partnership. Europe's role as a historic provider of space-based technologies and services to Africa and European efforts to provide Africa with information and data products from EO platforms, boosted the inclusion of space in this framework. The Eighth Partnership interlinks three priorities for development policy, i.e., science, information society and space applications, which individually and in conjunction with one another are deemed conducive to fostering socio-economic development in Africa. In that respect, this Partnership is cross-cutting in nature, contributing to the attainment of all other development objectives.

The JAES is updated at **EU-AU Summits** which alternate between Africa and Europe triennially and gather the Heads of State or Government of the Member States of the AU and the EU. Such Summits provide political guidance for further work. At the last EU-AU Summit, held in February 2022, the **Joint Vision for 2030**¹⁶⁶ was adopted, renewing the partnership established with the JAES.

As for the way forward, on 3 December 2020 a political deal has been reached among the chief negotiators of the **“Post Cotonou” Agreement**, expected to enter into force within 2023. The Cotonou Partnership Agreement¹⁶⁷ was first signed on 23 June 2000, by the then 15 Member States of the European Community and then 77 Member States of the African, Caribbean and Pacific Group of States to guide their relations. The Agreement was revised in 2005 and then again in 2010. According to its Article 95, it was due to expire on 29 February 2020. However, it has been extended until a new agreement is concluded or until 30 June 2023 at the latest.¹⁶⁸

The **initialled negotiated Agreement**¹⁶⁹, complemented by **three Regional Protocols** (for Africa, the Caribbean and the Pacific) has been made public on 15 April 2021. The Agreement recognises the **potential of space applications** and the relevance of cooperation among the Parties in this sector. Notably, the Parties acknowledge the role of **space as an enabler for social and economic benefits** in several areas, including the environment, climate change, ocean governance, transport, energy, agriculture, mining, and forestry and requires States to **cooperate on matters of common interest in civil space activities**, such as space research, Global Navigation Satellite Systems applications and

¹⁶⁶ Sixth European Union - African Union Summit, *A Joint Vision for 2030*, 18 February 2022.

¹⁶⁷ *Partnership agreement between the members of the African, Caribbean and Pacific Group of States of the one part, and the European Community and its Member States, of the other part, see supra.*

¹⁶⁸ European Parliament, Briefing - *After Cotonou: Towards a new agreement with the African, Caribbean and Pacific states*, 19 April 2023.

¹⁶⁹ The negotiated Agreement text initialled by the EU and OACPS chief negotiators on 15th April 2021 is available at https://international-partnerships.ec.europa.eu/system/files/2021-04/negotiated-agreement-text-initialled-by-eu-oacps-chief-negotiators-20210415_en.pdf

services, development of satellite augmentation systems, use of Earth Observation application and services and Earth Science (Art. 46 Agreement).

The **African Regional Protocol** reiterates that the Parties shall harness the potential benefits of space science, technology, innovation and applications on matters of common interest in the area of civil space activities, such as space research, global navigation satellite systems applications and services, the development of satellite augmentation systems, earth observation and earth science, particularly the use of early warning and surveillance, and adds that the Parties shall cooperate to develop a responsible and sustainable space market and industry that promotes and responds to their respective needs (Art. 29, para 1).

As for the objectives, Parties shall cooperate to conduct activities that exploit space technologies and applications **for sustainable development and for the improvement of people's welfare** and these should address the Africa's socio-economic opportunities and challenges **taking into consideration the African Space Policy and Strategy**. In doing so, Parties commit to improve access to space derived data, information, services and products (Art. 29, para. 2). Finally, the use of space technologies and information systems is mentioned in support of climate action and the resilience to natural disasters (Artt. 51, 53).

It should be noted that the Cotonou Agreement is a legal framework for EU-sub-Saharan Africa relations, but, as such, it is meant to align with the EU Comprehensive Strategy with Africa to taking into account the relations with the countries of North Africa, the outermost regions of the EU (ORs) and the overseas countries and territories (OCTs) and improve dialogue with the African Union.

The Institutional Partnership

Besides the above-mentioned EU-AU Summits at the level of Heads of States and Governments, the **AU-EU ministerial meetings** take place on an *ad hoc* basis to exchange views, take stock of the commitments and advance cooperation in certain fields. Notably, at the 4th Agricultural Ministerial Conference of 22 June 2021, satellite data were considered among the useful digital solutions to be used in agriculture to combat diseases and strengthen rural communities.

Finally, the Commissioners of both the European Commission and the African Union Commission meet annually (the so-called **Commission-to-Commission meetings**), alternating between the cities of Brussels and Addis Ababa. The participants monitor the progress achieved between Summits and discuss how to improve the cooperation between the two institutions. During the 10th

Commission-to-Commission meeting, which was held on 27 February 2020 in Addis Ababa, the two sides further committed to continue cooperation in science, technology, and innovation to address joint challenges and recognised the contribution of EU space programmes for the African Outer Space Programme objectives, particularly in the Earth Observation domain.

An Insight on the EU Programmes in Africa

Outer space has always featured in the governance frameworks and **action plans** of the JAES, which covered the periods 2008-2010, 2011-2013, 2014-2017 and 2018-2020. In order to defining a new joint partnership agenda beyond the JAES, on 9 March 2020, the European Commission and the European External Action Service (EEAS) released the joint communication “*Towards a Comprehensive Strategy with Africa*”,¹⁷⁰ endorsed by the Council on 30 June 2020. The joint communication is not a full-fledged strategy as such, but a proposal to jointly develop a strategy with Africa. The document envisages five Partnerships, whose objectives are the axis on which the EU wishes the strategy to focus on. Space data and technology feature Partnership 2 on Digital Transformation.¹⁷¹ On this basis, at the 6th EU-AU Summit held in Brussels in February 2022, they agreed on a joint vision for renewed partnership.¹⁷²

Within the framework outlined so far, long-term programmes have been implemented. The main programmes are **GMES and Africa**, **EGNOS in Africa JPO**, and **ClimSA**.

GMES and Africa

The most longstanding and wider cooperative initiatives between the EU and the AU Member States are on EO, which is also the primary space application exploited in Africa for achieving SDGs. The main initiative is the “GMES and Africa”, which provides for an extension of the GMES programme to Africa. The GMES (now Copernicus) programme is an EU-led initiative in partnership with the ESA. Notably, ESA’s role is to implement the dedicated GMES space component, which involves developing the *Sentinel* satellites, and to coordinate contributions from the ESA Member States, the European Organisation of Meteorological Satellites (EUMETSAT) and other mission operators. “GMES and

¹⁷⁰ High Representative of the Union for Foreign Affairs and Security Policy, *Joint Communication to the European Parliament and the Council, Towards a Comprehensive Strategy with Africa*, 9 March 2020.

¹⁷¹ PICHON E., *Understanding the EU's approach to a new partnership with Africa*, European Parliamentary Research Service, February 2022.

¹⁷² *A Joint Vision for 2030*, 6th EU-AU Summit, 17-18 February 2022.

Africa” started in 2007 during the 2nd EU-Africa Summit to provide African continental, regional and national decision-makers with EO data and tools necessary to support the achievement of the sustainable management of the African environment.

The initiative has evolved over time to include capacity-building elements for developing African EO capacities in several key areas, including natural disasters, food security and rural development, sustainable management of natural resources and water, and adaptation to climate change impacts. For instance, within the programme, a space training initiative with the Pan-African University on Space has been established to develop higher-level skills. “GMES and Africa” initiative also launched a Digital Learning Platform (DLP), which focuses on the development of expertise in EO applications in Africa. Finally, the programme plays a pivotal role in supporting the African Earth Observation System.¹⁷³

Twelve consortia of institutions, representing the Eastern, Western, Northern, Southern and Central regions of the African continent and a total of 45 African countries, implement the Programme. Notably, the East African consortium is led by the Regional Centre for Mapping of Resources for Development (RCMRD), based in Nairobi, Kenya, and operates to aid communities and individuals dealing with natural resources management.

EGNOS in Africa Joint Programme Office (JPO)

On satellite navigation, the European Geostationary Navigation Overlay Service (EGNOS), the EU flagship programme used to improve the performance of global navigation satellite systems, has been extended to Africa through the establishment of the “EGNOS in Africa” Support Programme with the aim of accompanying the development of air transportation in Africa through the modernisation of air navigation systems. Notably, two Ranging and Integrity Monitoring Stations of EGNOS have been installed in Egypt and Morocco to extend EGNOS signals. The third phase of the Programme is planned to cover 2021 up to 2024 period. The programme is managed by the Joint Programme Office (JPO) based in Dakar, Senegal, and the Steering Committee is co-chaired by the AUC and the European Commission.

Interested entities are required to establish a working arrangement with JPO to access the services offered. The main beneficiaries of the Programme are the AUC, the African Civil Aviation Commission (AFCAC), the International Civil

¹⁷³ AU, *Second Continental Progress Report on Agenda 2063*, cit.

Aviation Organisation (ICAO), the RECs, the *Agence pour la Sécurité de la Navigation Aérienne en Afrique et à Madagascar* (ASECNA), the African Civil Aviation Organisation (ACAO), but can also encompass interested States and Air Navigation Service Providers (ANSPs), interested Airlines, and training institutions. Kenya can benefit from the programme indirectly, by being a member of the RECs which established a working arrangement with JPO, namely COMESA, EAC, and IGAD.¹⁷⁴

ClimSA

A fully EU-financed ongoing initiative is the intra-African, Caribbean, and Pacific countries (ACP) ClimSA programme, which is developed in the African continent in partnership with the AUC and six RECs. It aims at improving the production, access to and use of climate information, services, and applications for decision-makers to foster sustainable development through the prevention of desertification, preservation of ecological biodiversity and the sustainable use of water management.

The main users of climate services are the RECs, the AUC, the Caribbean Meteorological Organisation (CMO), and the Secretariat of the Pacific Regional Environment Programme (SPREP). They also represent the bridge to other final users in the regional areas involved. Kenya can benefit indirectly from the services by being a member of IGAD and through the AUC.

Bilateral Cooperation with European Countries

International cooperation mechanisms and partnerships on space activities have always played a fundamental role in Africa, responding to two different but interrelated needs. On the one hand, international partnerships allow the **exploitation of space-derived data and services** to attain sustainable development objectives; on the other hand, following the growing presence of emerging space nations in the continent, such cooperation is essential to **finance and sustain** the space ambitions of those countries. The mechanisms for international cooperation employed by States are various and different in nature, form, and substance, depending on the scope.

Space cooperation, in most cases, entails the conclusion of **bilateral agreements** between African countries and third countries with established space capabilities to benefit from transfers of experience and expertise. In some

¹⁷⁴ On the RECs and their membership see Section 2.

cases, such agreements allowed for the establishment of long-lasting relationships between the countries involved and generated an extension of the scope of cooperation. Some agreements include **capacity-building** elements, considered essential to support the development of indigenous space capabilities or to harness the benefits deriving from space applications, such as the capacity to exploit EO data provided by foreign space applications and platforms. A dynamic sector of international cooperation is also related to African countries' **access to space**, i.e., the development, crafting or launch of satellites by African countries in partnership with foreign ones.

Cooperation among European and African countries in the space sector is wide and favoured by the already existing and consolidated relations among them in other fields. In this light, and considering the scope of the OSL Project, an overview of the fruitful Italy-Kenya cooperation on space activities is provided.

Overview of Italy-Kenya Cooperation on Space Activities

Cooperation between Italy and Kenya on space activities started in the early Sixties with the establishment of the San Marco-Malindi launch and tracking station, today renamed **Broglio Space Centre** (BSC), an Italian launching facility located in Kenyan territory. Indeed, due to its equatorial location on the Indian Ocean coast, the Centre has been an ideal site for both **launch and ground control** of satellites.

The facility is composed of a maritime segment, which comprises two platforms anchored to the seabed, and a ground segment, hosting antennas and other equipment for satellite tracking and monitoring. The first launch from the base was performed on 26 April 1967, when the San Marco 2 satellite was successfully placed in an elliptical equatorial orbit onboard a Scout vehicle. Thenceforth, the San Marco-Malindi base was made available to all the States willing to launch their own satellites, since the aim of the San Marco Project was not only to provide Italy with its own launch facility, but also contributing to the strengthening of international cooperation in space activities.¹⁷⁵ Since 1967, twenty-three satellites have been launched therefrom, including four Italian ones, and space missions of various international agencies, as well as the acquisition of satellite data, have been performed. Launching activities stopped in 1988 but the Centre continued to reliably provide ground services to space missions.¹⁷⁶

¹⁷⁵ BROGLIO L., *Il Programma spaziale italiano*, in *Il Pegaso*, 1962, p. V.

¹⁷⁶ See FERRAJOLO O., *Launch and Tracking Stations: the San Marco Malindi Case*, *cit.*

The Centre has been managed until 2003 by **Sapienza University of Rome** and then by the **Italian Space Agency** (ASI). The base has been also included in the European Space Agency's network of tracking stations (ESTRACK).¹⁷⁷

The current operation of the Base is governed by an **intergovernmental agreement** concluded between Italy and Kenya in **2016**.¹⁷⁸ Through the Agreement, the Parties committed to cooperate in the use of the Broglio Space Centre “for peaceful uses only”, for the activities identified in Article II, including Earth Observation, space science and technology, satellite data acquisition, tracking and telemetry, and education and training. The 2016 agreement provides prerogatives and obligations of the two States (Articles VIII and IX) and governs the allocation of liability for damages (Article XI).

Besides establishing a system of joint management of the Centre, with personnel from both countries,¹⁷⁹ the agreement also contains detailed provisions on a number of areas of cooperation. Indeed, the Broglio Space Centre is the means whereby space cooperation between Italy and Kenya was established and then extended to activities that are not necessarily connected with the polygon, but functional to the development of the Kenyan space sector, including capacity-building initiatives and the consolidation of expertise.

The **areas of cooperation** mentioned in the Italy-Kenya Agreement¹⁸⁰ are broadened and further detailed in the **five implementing arrangements** forming part of the Agreement, which deal with access to EO data, telemedicine, support to the Kenya Space Agency, the establishment of a regional Centre for EO, education and training.

Final Remarks

¹⁷⁷ ESA, *Find ESA Tracking Stations*,

http://www.esa.int/Enabling_Support/Operations/Estrack/Find_ESA_tracking_stations.

¹⁷⁸ *Agreement between the Government of the Republic of Kenya and the Government of the Italian Republic on the Luigi Broglio – Malindi Space Centre, Kenya*, supra note 2. The Italian Parliament authorised the ratification of the agreement by Law No. 149 of 25 November 2019, while Kenya completed its procedures under the 2010 Constitution on 15 October 2020.

¹⁷⁹ According to the 2016 Agreement, the Director of the base, appointed by the Italian government through ASI, is flanked by a deputy Director indicated by the Kenyan government. There is also a control system for the implementation of the agreement based on three joint bodies, the Joint Council of Ministers (Article IV), the Joint Steering Committee (Article V) and the Joint Management Body (Article VI), in which the parties are equally represented and alternate in the presidency.

¹⁸⁰ *Agreement between the Government of the Republic of Kenya and the Government of the Italian Republic on the Luigi Broglio – Malindi Space Centre, Kenya*, cit.

A fast development of the African space sector is expected in the coming years, characterized by a steady progress in terms of technology and capacity-building. As has been the case since the early phases of space capabilities development in Africa, this evolution will be certainly favoured and supported by international cooperation. Among the international space actors involved in cooperative mechanisms with African countries, the EU, the ESA, and the individual European countries, including Italy, may continue to play a relevant role in this path.

The long-standing relations between Europe and Africa in multiple fields extends also to the space sector. As in other areas of cooperation, such a relationship has a dynamic history that mirrors an intricate array of national, regional, and international interests and strategies. Early forms of multilateral cooperation between Europe and African countries, parallel to the bilateral cooperation carried on by European States, began in 1975 with the establishment of the ESA. Over the years, ESA has diversified its engagement with emerging space nations by developing a number of initiatives aimed both at its strategic objectives and at meeting the needs of specific geographical areas, including Africa.

As for the European Union, its main interlocutor in the continent is the African Union. EU-AU cooperation in the space sector has been taking place within the framework of the JAES since 2007. The primary features of such partnership and the programmes implemented therein, both in terms of content and institutional management, were thus provided. Notably, outer space has always featured in the governance frameworks and action plans of the JAES and has resulted in long-term programmes, including GMES and Africa, EGNOS in Africa JPO, and ClimSA.

As for the forms of such cooperation, recent years witnessed a slight shift from bilateral relations to the establishment of strategic partnerships. Indeed, the development by an increasing number of emerging countries of indigenous space capabilities, favoured by the transfer of technical capabilities and knowledge from space faring nations, gives way to the mutual sharing of expertise and enhanced forms of cooperation to achieve common goals. An envisaged development of bilateral cooperation between African and third countries in the space sector is, thus, the engagement in common endeavours, where the two parties have a collective capacity to deliver. In this light, current space cooperation between the EU and Africa in the form of a partnership is mutually beneficial. While this collaboration allows African countries to develop local capacity and industry, for the EU it serves as a means of space diplomacy, supporting the EU's interests on the continent, as well as a share in Africa's space economy for the EU industry.

As for State-to-State cooperation, special consideration has been devoted to Italy-Kenya cooperation. Starting from the establishment of the Broglio Space

Centre in the 1960s, bilateral cooperation with Italy on space activities has played a crucial role in Kenya's entry among the emerging space countries. Training and capacity-building activities for local technicians have enabled the country to acquire the know-how needed to develop a national space sector, which is becoming increasingly well-defined, including from the standpoint of institutional and normative governance of such activities.

CONCLUSIONS

Africa is the second-largest continent of the world and hosts more than fifty countries. Framing a comprehensive picture of the development dynamics underway on the continent is, thus, challenging. Nonetheless, most African countries face similar concerns, mainly related to the promotion of sustainable development.

The Report first assessed whether and how space applications, including remote sensing, telecommunications, and navigation and positioning, can support social and economic development of the African continent, as well as the management of natural resources and the protection of the environment. The outcome is that space activities are especially functional and beneficial to achieving sustainable development goals, positively impacting its three dimensions, i.e., social, economic, and environmental. There is not widespread public awareness of the possibilities opened by space activities to date, but recent advancements in the sector highlight an encouraging reversal of trend, with a number of countries developing technological space capability and specific regulations.

Looking at the evolution of the African space landscape, constraints in terms of financial and human capital have for long jeopardized African countries' capability to harness the benefits of space applications. In recent years, these have been partly mitigated by wider dissemination of space science knowledge and expertise. Furthermore, the development of NewSpace applications, including small satellites, which are cheaper and easier to assemble than traditional ones, have allowed more African countries to access outer space, and to become autonomous actors, i.e., producers rather than only consumers of space services. This also generated a growth in investments in space programmes. Such developments favoured the establishment of space ecosystems, built on the interaction between governments, industry and society, and resulted in the development of diversified space sectors according to the forms of the interactions.

The analysis conducted on the African space sector highlights that most space activities are led by the Government, while few countries have created a space market and established industrial capacity. Nevertheless, the private sector represents an integral part of the realization of space activities, providing contractors, components in the supply chain, and services. In this regard, institutional and normative governance at both the regional and national levels can positively impact the development of a mature space sector and encourage the involvement of privates.

The governance of space activities in Africa has been analysed at the continental, sub-regional and national levels.

At continental level, the highest authorities expressed their commitment to an African coordinated space process through the adoption of a significant number of programmatic documents. These include the recalled *Agenda 2063*, a strategic instrument to achieve inclusive and sustainable development goals on the African continent; its flagship project “African Outer Space Strategy”, which recognises the need to accelerate access to space technologies, products and data, as well as to adopt appropriate policies and strategies to develop a regional market; its first ten-year implementation programme, *AU Science, Technology, and Innovation Strategy for Africa 2024*, which makes reference to space-derived services as unique tools for the continent to address socio-economic development and for conserving the welfare of current and future generations; the *African Space Policy and Strategy* and the Statute of the African Space Agency. It has been noted that the adoption of policy instruments is an essential tool to create a stimulating environment for the development of space activities, with the main objective of establishing an indigenous space industry.

Over the years, the AU considered several governance options for the institutionalisation of the African space programme and to strengthen the role of African countries in the global space landscape. The establishment of the AfSA depicts a milestone for the institutional governance of space activities towards the promotion and coordination of countries’ efforts to implement the *African Space Policy and Strategy* and to conduct activities that use space technologies and applications for sustainable development, taking into account users’ needs. Nevertheless, the necessary steps to make AfSA operative are ongoing and it will take some time to assess the achievements that this step will bring in consolidating the regional institutional governance of space activities.

In this regard, a relevant element to underscore is the willingness of continental authorities to effectively adopt a common space policy and strategy, whose objectives can then be implemented by regulatory frameworks at the national level. On this point, there are still disparities between countries in terms of governance of national space activities. The study illustrates that African countries have adopted different approaches to regulate their space activities depending on the range of activities conducted and the involvement of the private sector. The establishment of national space agencies, or other entities, seems to be the first step to engage in the space sector. In most cases, this is accompanied by the adoption of national space policies and strategies to set the country space “vision” based on national specific needs. Some African countries are more structured from a legal perspective in so far as they have implemented detailed space legislation, including Nigeria and South Africa, while others have adopted

a sectorial approach establishing single regulation in specific fields of space activities, such as Morocco and Tunisia. Others are on their way to adopting theirs, such as Kenya.

The diversity and the technical complexity of space missions often imply the necessity to involve a wide range of actors and to engage in international and regional collaboration in order to develop space programmes. In this light, Africa-Europe cooperation was considered as the long-standing relations between countries of both regions in multiple fields and their proximity in terms of historical relations and geographical position.

Notably, EU-AU cooperation was investigated as it represents a relevant example of how multilateral cooperation in the field of EO (GMES and Africa) or telecommunications and navigation (Galileo, EGNOS) can evolve toward a strategic partnership in the development of space capabilities, as well as in the exchange of expertise and data. The partnership allows to strengthen the space policy dialogue between the entities, involving private actors and academia, and to implement programmes of mutual benefit. In this sense, while it is an opportunity for African countries to develop local capacity and industry, for the EU such partnership serves as a means of space diplomacy, supporting EU's interests on the continent, as well as a share in the African space economy for the EU industry.

Lastly, Africa-Europe cooperation entails bilateral forms of cooperation, as in the case of Italy and Kenya. Their cooperation resulted in the establishment of the Broglio Space Centre in Malindi, governed by bilateral agreements covering the areas of space science and technology, tracking and telemetry services, navigation and positioning as well as remote sensing. Notably, training and capacity-building activities for local technicians provided under such agreements have enabled Kenya to acquire the expertise needed to develop a national space sector, including from the standpoint of institutional and normative governance.

In conclusion, we are confident that this Report could be a functional tool to better understand the consolidation of space ecosystems in Africa.

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