African Union

EARTH OBSERVATI
TRENDS AND
PRIORITIES IN AFR

EO4African Symposium

ESRIN, Frascati, Italy
Sept. 23, 2024

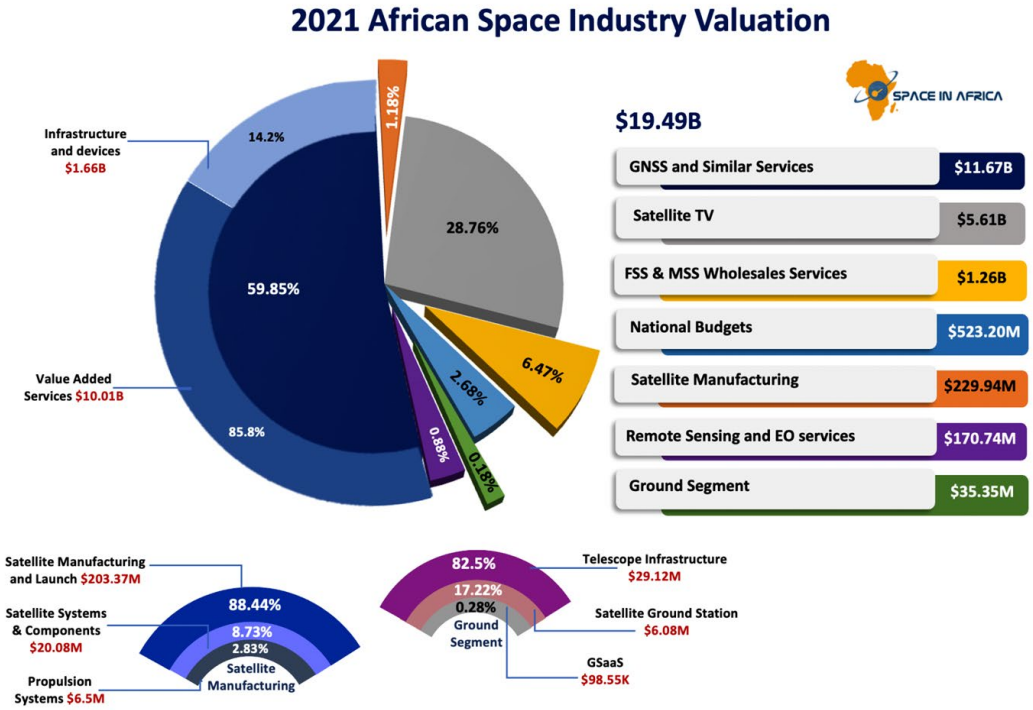
H.E. Dr Tidiane Ouattara
President
Council of the African Space Agency
African Union

THE AFRICAN OUTER SPACE PROGRAM: A FLAGSHIP OF THE AFRICAN UNION

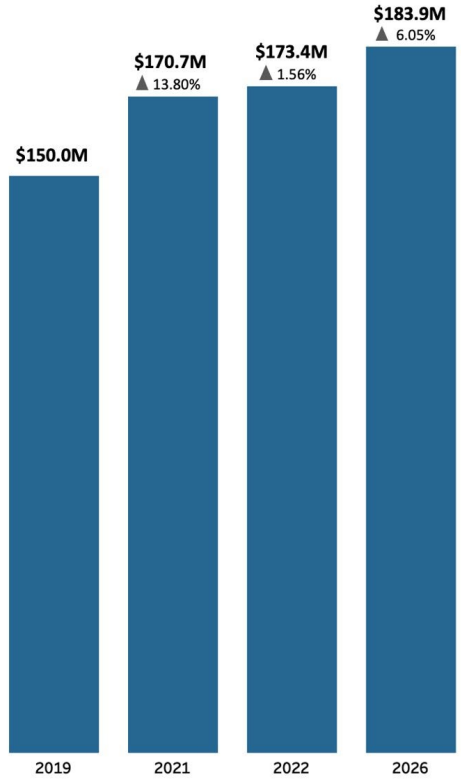
For an integrated, prosperous and peaceful Africa, driven by its own citizens and representing a dynamic force in the global arena

SPACE: A KEY DRIVER OF THE AGENDA 2063

African Space Economy



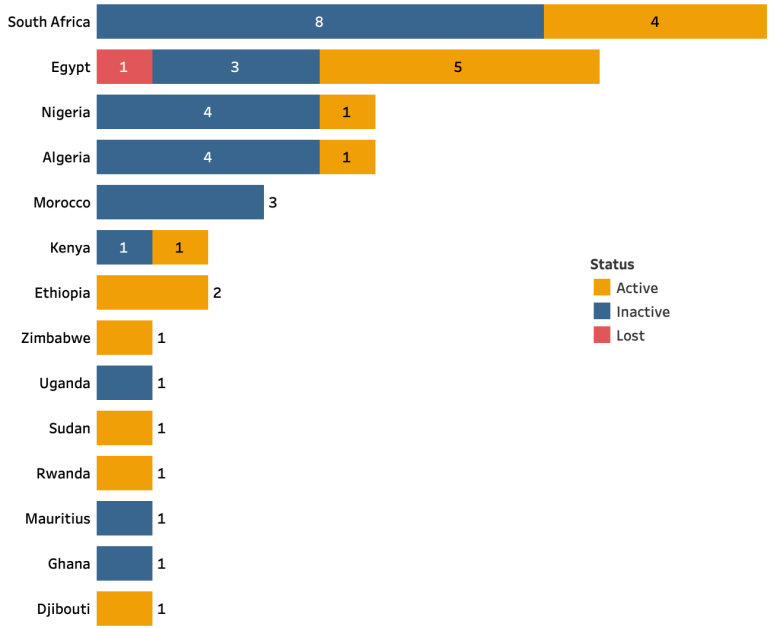
Africa's Remote Sensing and EO Market, 2019- 2026



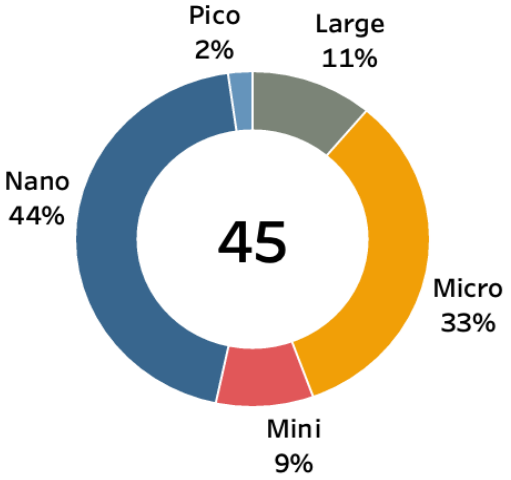
Revenue from Africa's Remote Sensing and EO Market (2019 - 2026). Source: Space in Africa

The African remote sensing and EO sector experienced robust growth between 2019 and 2021. Estimates indicate a **13.83%** increase during this period, reaching a value of **USD 170.7M** in 2021. This upward trend is expected to continue, with projections suggesting a further growth of **7.68%** over the next four years. By 2026, the sector is anticipated to reach a value of **USD 183.9M**.

African EO Infrastructures – Satellites



Number of EO satellites launched by country. Source: Space in Africa



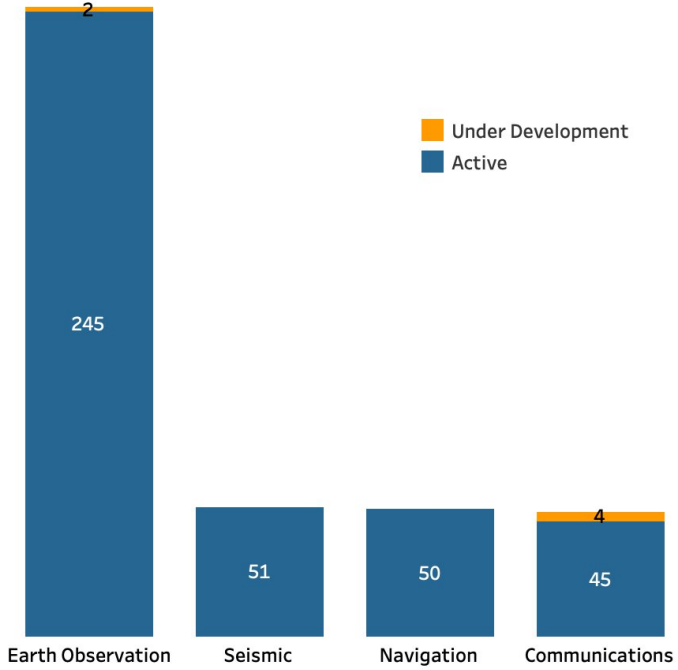
Pico = <1kg, Nano = 1 - 10kg, Micro = 10 - 100kg, Mini = 100 – 500kg, Medium = 500 – 1000kg, Large = >1000kg

Small satellites

Classification of past EO satellites by size. Source: Space in Africa

Earth observation satellites make up **77%** of African satellite launches, driven by the increasing demand for EO data and cost-effectiveness, and business opportunities available for new startups within the downstream sector. In the past seven years, **26** EO satellites were launched by **13** countries, focusing on high-resolution Earth imaging for resource management and agriculture. Additionally, there has been a notable shift towards smaller satellites, with **42** small satellites of various sizes (Nano, Micro, Mini, and Pico) being launched.

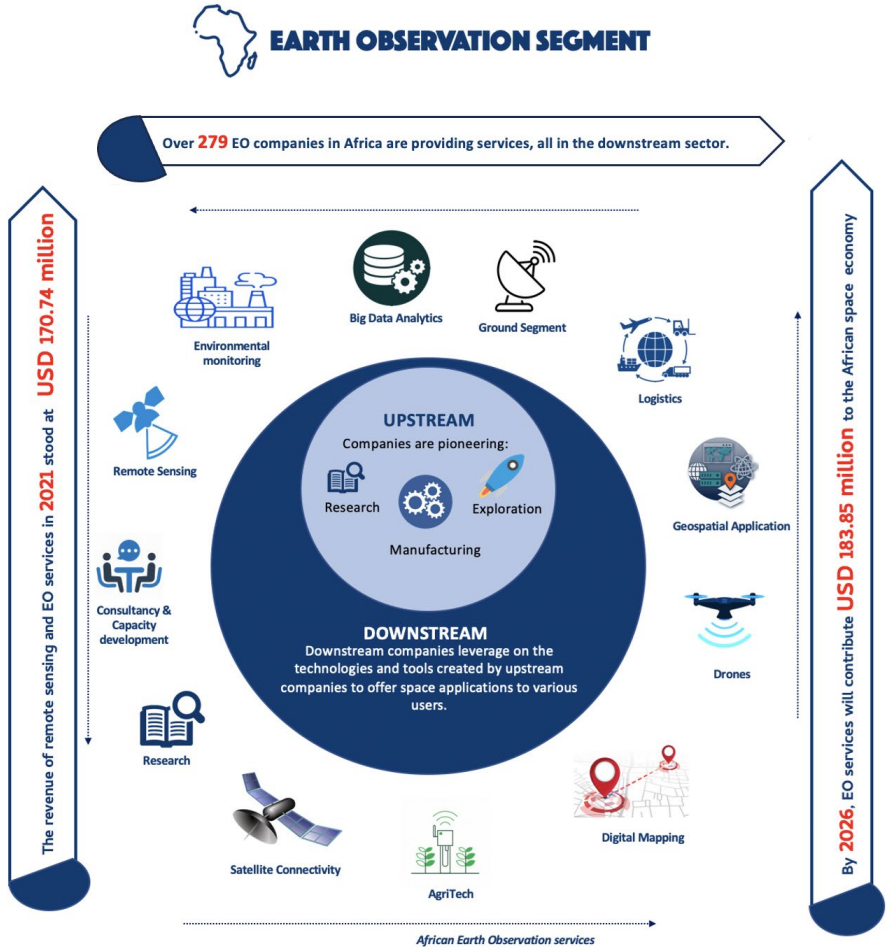
African EO Ground Infrastructures



Distribution of African ground station by mission type. Source: Space in Africa

A substantial portion of Africa's ground stations **(70.32%)** is dedicated to Earth observation. These stations play a crucial role in supporting meteorology, agriculture, and environmental monitoring applications by facilitating communication with regional and global space missions.

Overview of the African EO Ecosystem



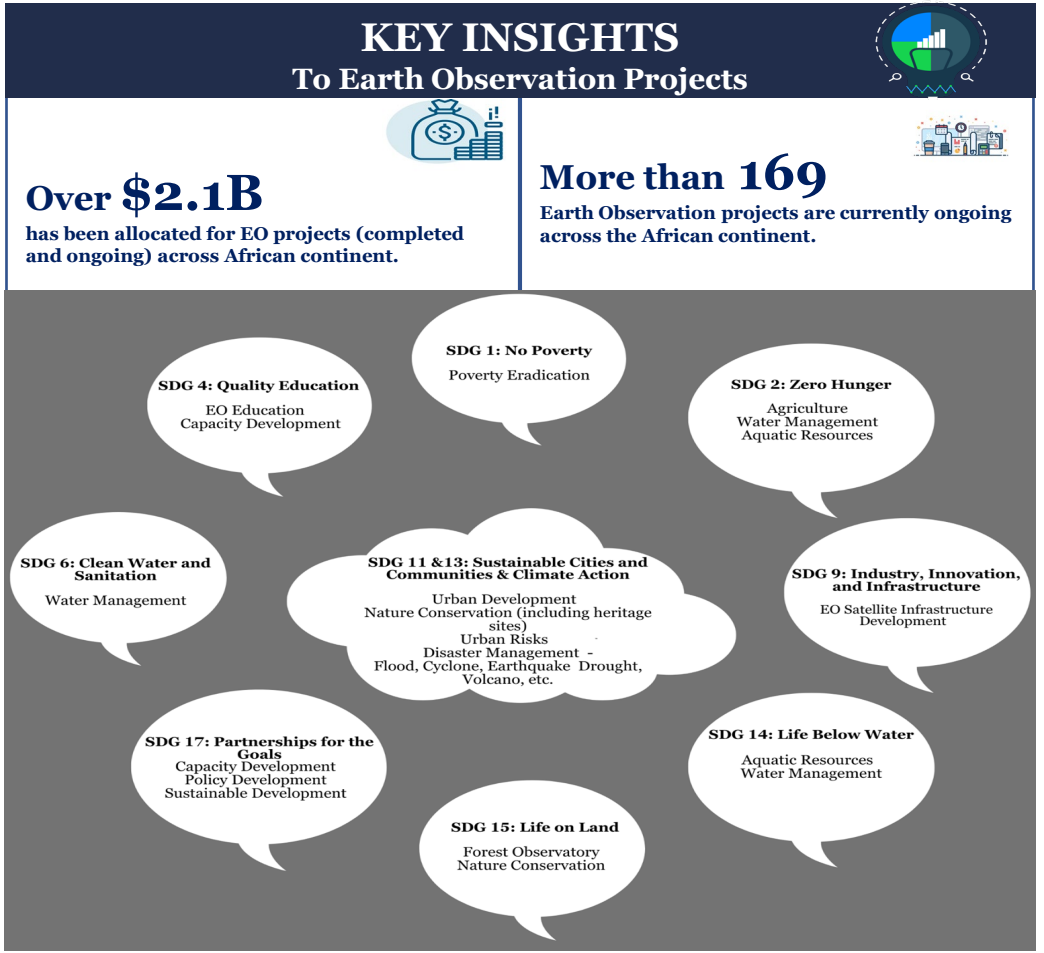
Overview of the African EO Ecosystem

EO companies founded in the last six decades in Africa. Source: Space in Africa

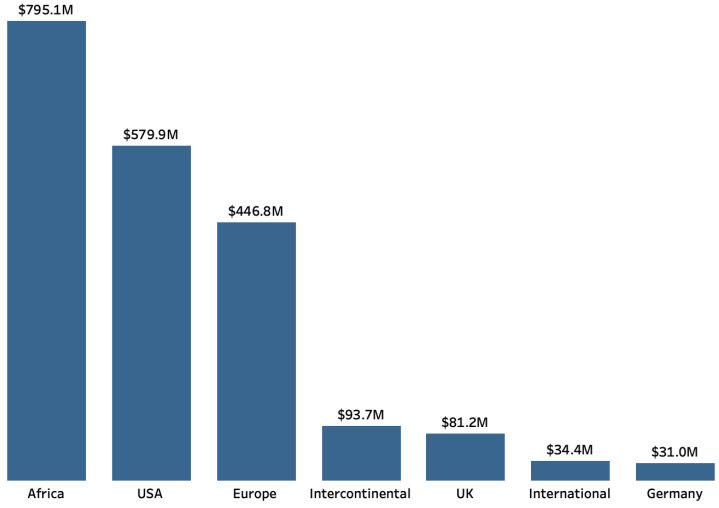
An estimated **279** African NewSpace companies operate within this service value chain. These companies, all downstream companies or startups in Africa, depend on the services of ground station operators, satellite operators, and foreign data resellers to develop satellite data products, EO application products, and geo-information products, a trend comparable to that observed in other regions.

EO and the SDGs

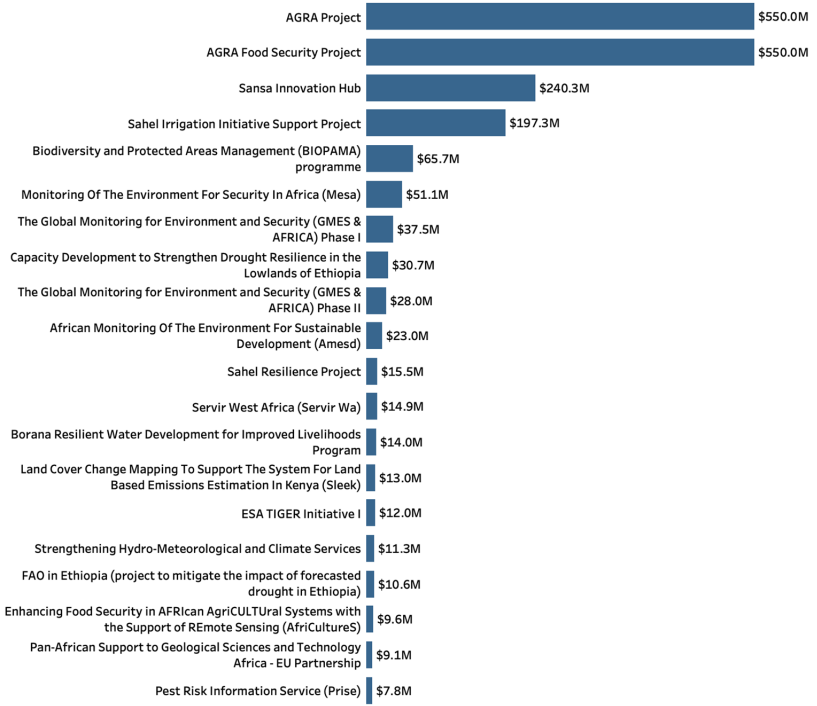
Integrating EO satellites and derived data is crucial in advancing the United Nations Sustainable Development Goals (SDGs). For example, EO technology provides critical data for monitoring environmental changes, managing natural resources, and assessing climate impacts, directly supporting goals such as combating climate change (SDG 13), ensuring sustainable land use (SDG 15), and improving water resource management (SDG 6).



Overview of EO Projects



Breakdown of funding for EO application projects by region (1992 – Aug, 2024)



Top 20 funded EO projects (1992 - Aug 2024)

Project Samples

Earth observation Data Cube for Africa (SGDs 2,6,11,13,15)

The aim of the project is to develop a continental-scale Data Cube that provides a routine, reliable and operational service which will enable African nations to track changes across countries in unprecedented detail.

Funded by – *The Australian government and The Leona M. and Harry B. Helmsley Charitable Trust.*

Implementing institution – *The Digital Earth Africa (DE Africa)*

Countries of Implementation – *For all African countries.*

Space for Disaster Resilience in Developing Countries (SDGs 1,9,17)

Using space solutions to make a positive and practical impact on the lives of those living in emerging and developing economies through partnerships with end users in the target countries to increase their capacity to respond to specific challenges.

Funded by *UK Space Agency's International Partnership Programme (IPP)* ***(£ 30M)***

Countries of Implementation
Kenya, Ghana, Uganda, Zambia, Ethiopia, Rwanda, Tanzania, South Africa, Madagascar.

Monitoring of the Environment for Security in Africa (MESA) (SDGs 12,13,15)

To enhance land degradation and natural habitats assessment and forest monitoring for sustainable management of environmental resources.

Funded by *European Union* ***(€ 37M)***

Implementing institution - *IGAD Climate Prediction and Application Centre (ICPAC), Kenya, Ethiopia Mapping Agency (EMA),*
National Environment Management Agency, (NEMA), Uganda.

Countries of Implementation
Kenya, Uganda, Ethiopia, Rwanda, Burundi, Sudan, Southern Sudan, Eritrea, Djibouti Somalia.

Project Samples

Drought And Flood Mitigation Service (DFMS) (SDGs 2,6,13,15)

Mitigating the impact of drought and flood in Ugandan society, providing information that enables improved water, environmental and agricultural management.

Funded by *UK Space Agency's International Partnership Programme (IPP)* ***(£ 4.6M)***

Implementing institution - *Rheatech*

Country of Implementation *– Uganda*

Monitoring for Information and Decisions using Space Technology (MIDST) (SDGs 8,9,15,17)

To monitor and guide the management of natural resources in support of decision making for the socio-economic development of the country.

Funded *by* *Group on Earth Observations (GEO) and Google Earth Engine (GEE)* ***($ 4M)***

Country of Implementation *– Kenya*

The Global Monitoring for Environment and Security (GMES & AFRICA) (SDGs 9,15,16,17)

To improve the capacity of African policymakers and planners to design, implement, and monitor national, regional and continental policies and to promote sustainable management of natural resources through the use of EO data and derived information.

Funded by *European Commission and the African Union Commission (Phase 1 -* ***€ 24,65M;*** *Phase 2 -* ***€ 31.75M***

Implementing institution – *AGEOS, CICOS, ICPAC, RCMRD, NARSS, Observatoire du Sahara et du Sahel (OSS), Council for Scientific and Industrial Research (CSIR), SASSCAL, CSSTE-Obafemi, Council for Scientific and Industrial Research (CSIR)*

Countries of Implementation *– African Countries*

GMES & Africa: The Programme

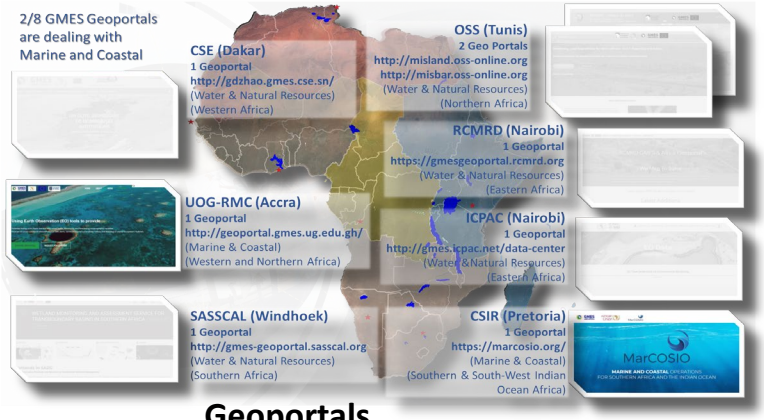
Impacting Africa :

- Monitoring Oil Pollution
- Potential Fisheries areas
- Monitoring Land Degradation
- Monitoring Wetlands
- Flood – Inundation
- Ocean State Forecasts:
- Saving Lives & Properties
- Navigability
- etc

GMES and Africa :
Phase 1 et Phase 2:

167 Institutions

GMES & Africa….A Community of Practice



Geoportals

Digital Learning Platform (DLP)

WOMEN IN African Union

GMES AND AFRICA

Women in GMES

Earth Observation Experts Network for Flood and Wetland

GMES AND AFRICA

AFWEN

GMES Network for flood and Wetland

GMES & Africa Academia Network

GAAN

African Union

GMES AND AFRICA

GMES Network of Academia

GAIA

GEO-Africa Incubator/Accelerator

Incubator / Accelerator

Project Samples

AfriCultures (SDGs 2,9,13,15)

AfriCultuReS aims to design, implement and demonstrate an integrated agricultural monitoring and early warning system that will support decision making.

Funded by *European Union* ***(€ 8M)***

Implementing institution – *AfriGEOSS, Group on Earth Observations Global Agricultural Monitoring Initiative (GEOGLAM)*

Countries of Implementation
Ghana, Ethiopia, Kenya, South Africa, Mozambique, Rwanda, Sahel Region And Niger.

Pest Risk Information Service (Prise) (SDGs 2,12,13,15)

The Pest Risk Information SErvice (PRISE) aims to solve this problem by using data to help farmers manage pests in up to five countries in sub-Saharan Africa.

Funded by *UK Space Agency's International Partnership Programme (IPP)* ***(£ 6.4M)***

Implementing institution – *CAB International*

Countries of Implementation – *Ghana, Kenya, And Zambia.*

Africover (SDGs 9,13,15,17)

Africover was a response to national requests for assistance in the development of reliable and georeferenced information on natural resources. The goal was to establish for the whole of Africa a digital geo-referenced database on land cover and a geographic reference.

Funded by ***I****talian Government* ***($ 5.4M)***

Implementing institution – *Food and Agriculture Organization (FAO)*

Countries of Implementation – *Burundi, Dr Congo, Eritrea, Egypt, Kenya, Libya, Malawi, Rwanda, Sudan, Somalia, Tanzania, And Uganda*

Firesat Project (SDGs 4,9,13,15)

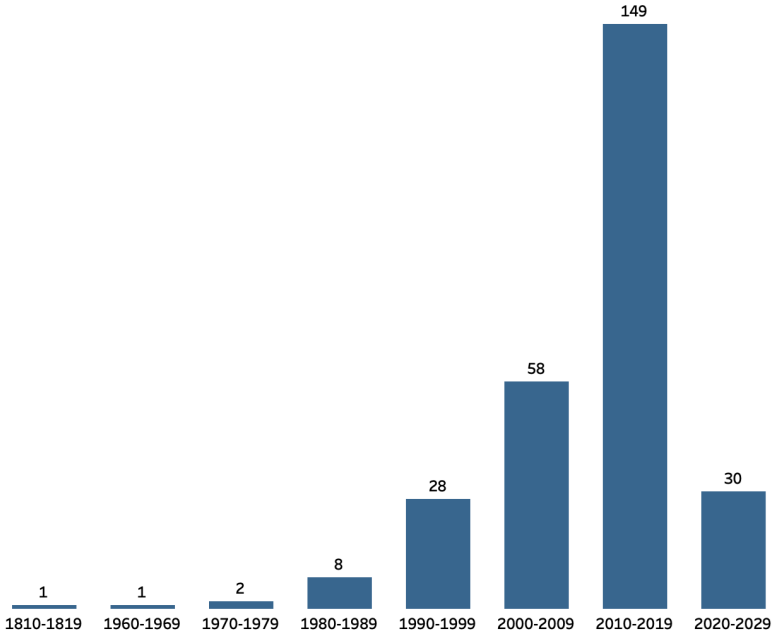
FireSat pilot programme will demonstrate the ability of nanosatellite technology to deliver enhanced fire detection data to be implemented into the existing Advanced Fire Information System (AFIS), developed by the CSIR as well as provide capacity building for future skills, technology and applications development.

Funded by *UK Space Agency's International Partnership Programme (IPP)* ***(£ 5M)***

Implementing institution – *Clyde Space*

Countries of Implementation – *Kenya, Namibia, And South Africa.*

What is Fuelling the Emergence of EO Companies in Africa?

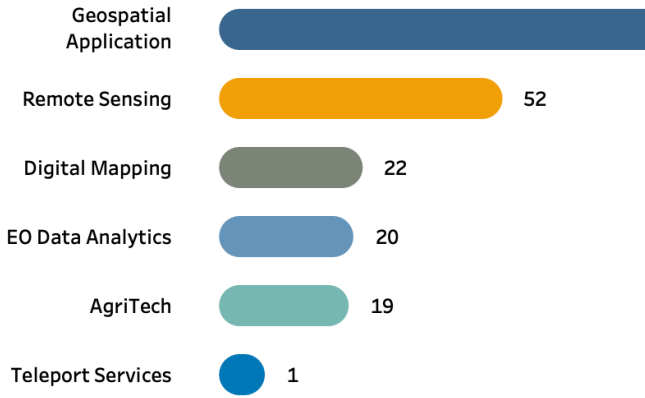


EO companies founded in the last six decades in Africa. Source: Space in Africa

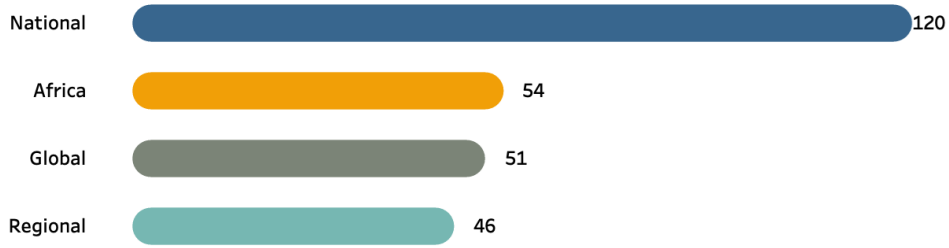
EO companies are becoming increasingly prevalent in Africa for several key reasons:

- Ability to address unique local challenges such as food security, urban planning, and resource management.
- They fill critical data gaps in areas lacking comprehensive ground-based monitoring systems.
- The decreasing cost of satellite technology and data processing has made EO more accessible to African entrepreneurs and organisations.
- Increasing government support and awareness of EO's value in decision-making have fuelled the sector's growth.

Services Rendered by African EO Companies



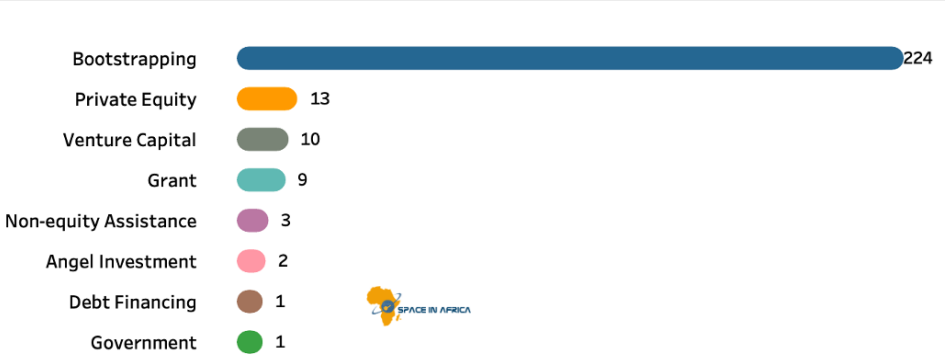
What specific services do African EO companies offer? Source: Space in Africa



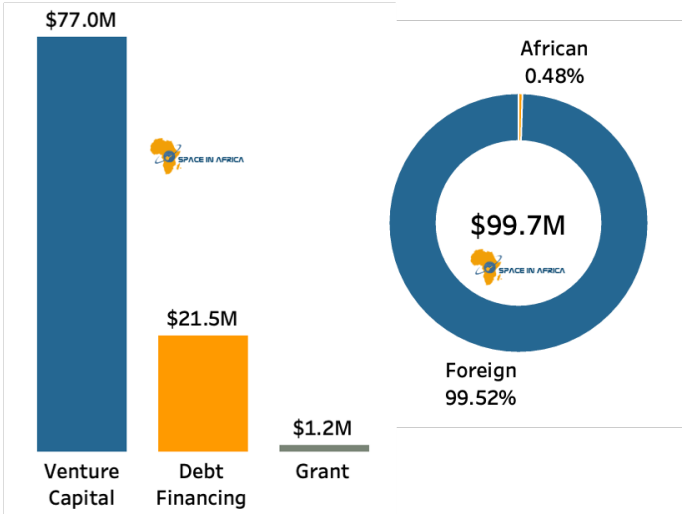
Distribution of African EO companies based on the market served. Source: Space in Africa

The diversity of services rendered by African Remote Sensing and EO companies illustrates the industry's evolving landscape. In addition, their ability to cater to various markets reflects the maturing nature of the sector, positioning these companies for more significant impact, collaboration, and competitiveness in both regional and international arenas.

Funding Landscape of African EO Companies



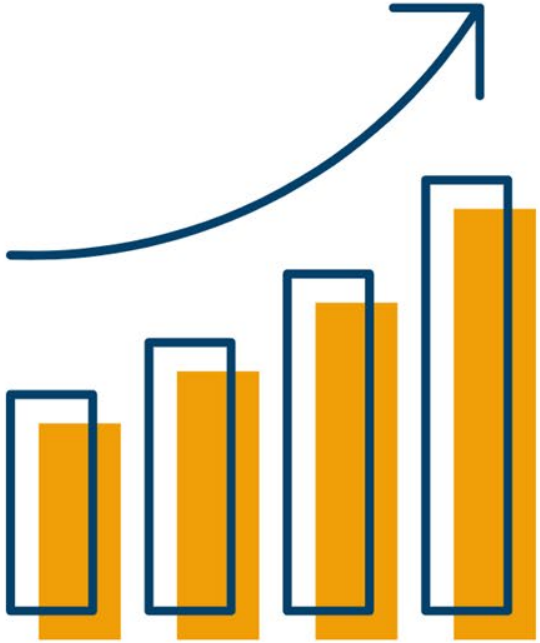
How do African EO companies fund their business? Source: Space in Africa



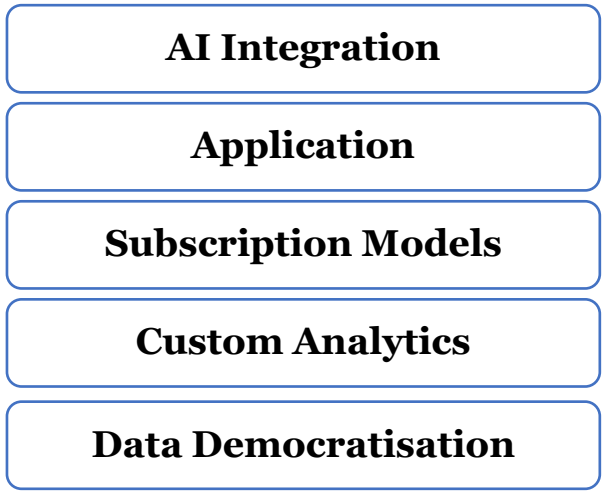
Breakdown of total funding raised by African EO companies (2015 - August 2024) . Source: Space in Africa

Since 2015, African Earth Observation (EO) NewSpace companies have secured over **USD 99M** in funding. Notably, approximately **97%** of this total investment has been sourced from international investors outside of Africa, highlighting the significant role of foreign capital in driving the growth and development of the continent's EO sector.

Trends, Opportunities and Challenges within the African Remote Sensing and EO Market



Business Trends Shaping the African EO Segment

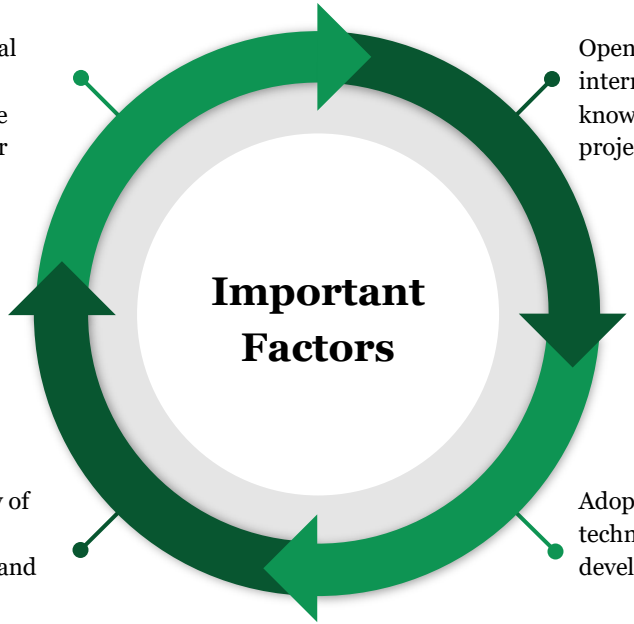


Application services and custom analytics drive demand for non-defence use cases. International operators provide the upstream layer and work with partners locally on downstream applications.

A significant trend in Africa's remote sensing and EO industry, reflecting global shifts, is the move away from manufacturing EO satellites. Historically, these satellites were often small-scale projects that could not deliver adequate resolution or coverage to ensure their applicability in critical thematic areas. Now, operators and service providers are increasingly utilising the infrastructure of global operators, opting for subscription-based models to access data as required rather than investing in developing their own below-par satellite systems.

Other key trends include the integration of AI for enhanced data analysis, the growing use of subscription models for accessing EO data, the demand for custom analytics tailored to specific needs, and the movement towards data democratisation, making EO insights more accessible to various sectors. These trends align with global shifts and are shaping the future of the African EO landscape.

Factors Responsible for the EO Industry Growth



Creation of intentional policies to stimulate growth and create the right environment for business to thrive.

Openness to work with international partners for knowledge sharing and project implementation.

Increased availability of EO data through subscription models and open-data initiatives through coordinated continental efforts

Adoption of latest technologies and capacity development

Challenges Limiting the Growth of the African EO Markets

01 Fierce competition between local companies and agencies/research institution

02 Unstructured business model (B2B, B2C, B2G)

03 Too much focus on services - less on products

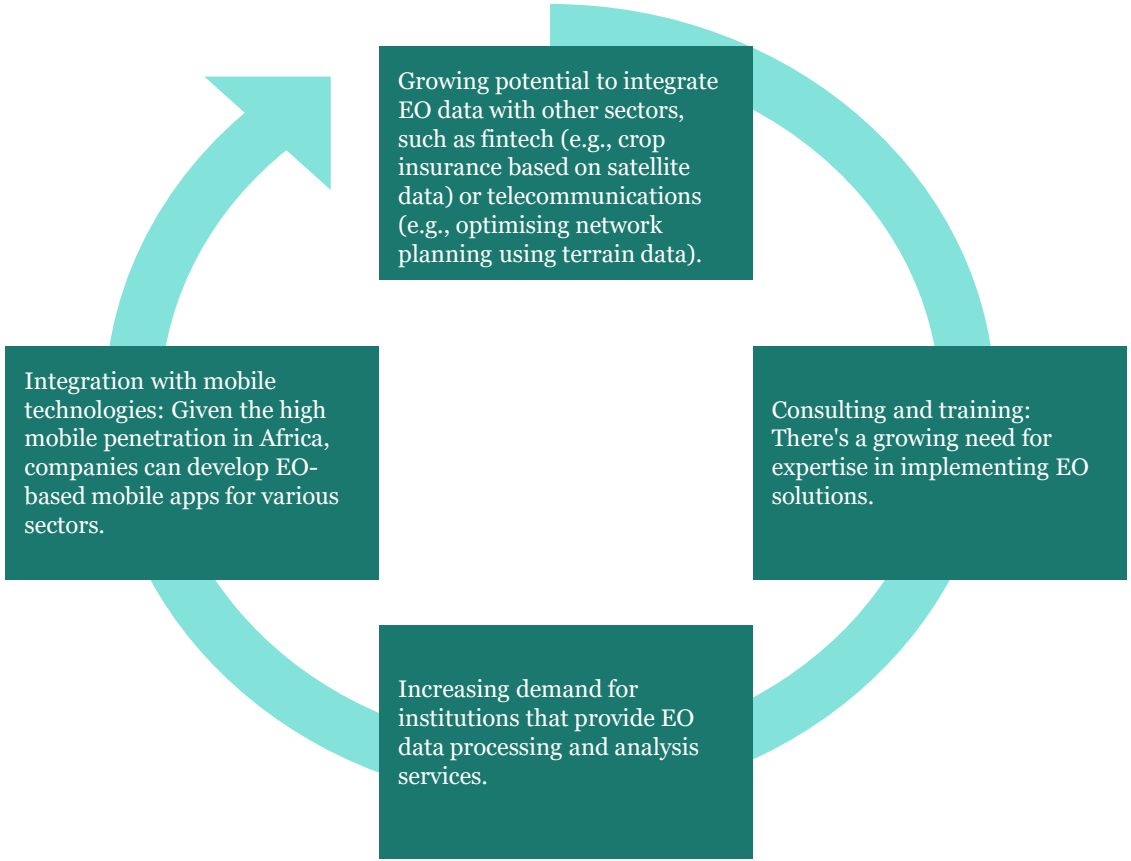
04 Lack of capitals and investors

05 Cross border scalability

06 Low market awareness and low adoption of EO technologies

07 Competition from international players with more advanced technologies and greater resources

Key Opportunities for EO Companies to Tap into



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