



**THE EAST AFRICAN REGIONAL
SPACE SCIENCE AND
TECHNOLOGY STRATEGY
2023-2028**

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EXECUTIVE SUMMARY

The East African Community (EAC) is a regional inter-governmental organization comprising the Republics of Burundi, Kenya, Rwanda, South Sudan, the United Republic of Tanzania, and the Republic of Uganda. The Community aims to foster Regional Integration and socio-economic development among Partner States through development of policies and programmes to widen and deepen co-operation in political, economic, social and cultural fields including science, technology and innovation.

The Treaty for the Establishment of the East African Community recognizes Science and Technology as a key driver for sustainable socio-economic development. The treaty explicitly provides for the Partner States to promote and support cooperation in the development and application of science and technology within the Community, in Article 5, 12 and Article 103. In response to the provision of the Treaty, the EAC Summit of Heads of State established the East African Science and Technology Commission, EASTECO, in 2007, as a semi-autonomous institution of the East African Community to promote and coordinate the development, management, and application of Science and Technology in the Partner States.

The Protocol establishing EASTECO mandates the Commission as the main regional agency through which the EAC Partner States will develop and implement common Science and Technology policies, programs and projects, in priority areas that include human resources development, collaborative research, technology development and innovation. These regional STI priorities are to enable and support the sustainable production of goods and services and enhance economic competitiveness in accordance with the EAC Common Market Protocol of 2010 and the EAC Vision 2050.

The formulation of the regional space science and technology strategy is aimed at contributing to the objectives of EASTECO. The strategy is purposed to create, promote and integrated EAC outer space program for an innovative and competitive STI sector for the wellbeing of our people.

The development of this East African Regional Space Science and Technology Strategy was stakeholders driven and was undertaken through a six-steps process. This included documenting the status of space science and technology in the region, mapping of the key stakeholders involved in the East African space science and technology Ecosystem, field data collection, preparation of a draft strategy, regional validation of the strategy and preparation of monitoring and evaluation, and a comprehensive strategy implementation plan.



The situation analysis identified strengths and gaps in the region's space science and technology ecosystem anchored on six (06) objectives, which have informed the EAC regional space science and technology strategy. The vision, mission, goals and strategic objectives are as follows:

Vision: A well-coordinated and effective utilization of space science and technology for east Africa growth and development. **Mission:** To create and promote and integrated EAC outer space program for an innovative and competitive STI sector for the wellbeing of our people.

Goals: The EAC Regional space science and technology programme will be aligned with the following primary goals, namely –

- I. To provide a guiding framework for development, promotion and coordination of the implementation of activities that exploit space science and technologies for regional integration, sustainable development and global competitiveness;
- II. To create a well-coordinated and integrated EAC space science, technology and innovation programs that are responsive to user needs;
- III. To support the development of systems and applications to enhance the uptake and utilization of space derived data and information for decision making;
- IV. To develop and enhance the human capacity in Space Science & Technology;
- V. To build requisite space science and technology infrastructure;
- VI. To conduct long-term planning and implementation of space-related innovation programs to deliver cost-effective space-based products and services;
- VII. To promote research and development in space science and technology in public and private institutions as well as partnership;
- VIII. To promote the development of an appropriate and competitive domestic and regional commercial space sector in order to provide the industrial base to meet the regional's needs for space technology;
- IX. To collect, archive, assimilate and disseminate space data to support policy, decision-making and sustainable economic growth in the region.

Strategic Objectives: The above vision and mission will be realized through the following six (06) strategic objectives:

Strategic Objective 1: Delivery of Space applications, products and Services

Strategic Objective 2: Human capital development and Public Awareness

Strategic Objective 3: Space Innovation and Research Development

Strategic Objective 4: Space Infrastructure and Industrial Development

Strategic Objective 5: Sustainable Funding and Resource Mobilization

Strategic Objective 6: Strengthening Coordination, Collaboration and Partnerships

The six strategic objectives have 43 strategic actions/activities that have been formulated which will be implemented in a period of five years. Some strategic actions/activities will be implemented by EASTECO while most of the activities will be implemented by the member states with EASTECO provided a facilitating role.

Approximately US\$7,260,000 will be required to implement this strategy. The resources will be mobilised through EASTECO budget, EAC countries as well as development partners. There are several players such as UN, EU, ESA, NASA as well as UNDP, which currently have special interest in promoting space science and technology, particularly those activities related to national and institutional policies, capacity building and development of Space applications, products and Services.

These partners will be targeted to mobilise resources for the implementation of the strategy.

The strategy has a costed implementation plan. The implementation of the EA Regional Space Strategy will be undertaken by EASTECO, Partner States and their agencies, as well as the private sector. A four-level implementation structure is proposed, which consists of EASTECO Governing Board, Regional Innovation and Technology Working Group, National Space Coordination Team (NSCT), and Implementing Agencies.

The Strategy Monitoring and Evaluation plan will guide the monitoring of the implementation of this strategy. The plan serves as a tool to guide in the overall execution of the East African Regional Space Science and Technology Strategy. It is expected that the strategy implementation team will update it as necessary to reflect changes in the strategy and ongoing tasks. Updates will also incorporate feedback from stakeholders as well as other implementing partners.



LIST OF ACRONYMS

ACMAD	African Centre of Meteorological Application for Development
ACP	African, Caribbean and Pacific
AFREF	African Geodetic Reference Frame
AGIA	African Geospatial-Intelligence Agency
AI	Artificial Intelligence
AIS	Automatic Identification System
AIT	Manufacturing, Assembly and Integration
ARDC	Africa Regional Data Cube
ARMC	Africa Resource Management Constellation
ASCG	Arab Space Cooperation Group
ASECNA	Agency for Air Navigation Safety in Africa and Madagascar
ASNARO	Advanced Satellite with New System Architecture for

Observation

AU	African Union
AU	African Union
AUC	African Union Commission
AVN	African VLBI Network
CAT	Content Analysis Technique
CEOS	Committee on Earth Observation Satellites
CERN	European Organization for Nuclear Research
CMOS	Complementary Metal-Oxide-Semiconductor
CNES	National Centre for Space Studies (France)
COMESA	Common Market for Eastern and Southern Africa
COPUOS	Committee on the Peaceful Uses of Outer Space
CORS	Continuous Operating Reference Stations
DMC	Disaster Monitoring Constellation
DRC	Democratic Republic of the Congo
DS	Defence & Space
EAC	East African Community
EASTECO	East African Science and Technology Commission
ECOWAS	Economic Community of West African States
ECSS	European Cooperation for Space Standardization
EGNOS	European Geostationary Navigation Overlay Service
EISCAT	European Incoherent Scatter
EO	Earth Observation
ESA	European Space Agency
EU	European Union
EUSPA	European Union Agency for the Space Programme

FAO	Food and Agriculture Organization of the United Nations
GEO	Geosynchronous Equatorial Orbit
GIS	Geographic Information System
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GLONASS	Global Navigation Satellite System (Russian)
GMES	Global Monitoring for Environment and Security
GNSS	Global Navigation Satellite System
ICT	Information and Communication Technology
IGS I	International GNSS Service
IPR	Intellectual Property Rights
ISABU	Agricultural Research Institute of Burundi
ISR	Intelligence, Surveillance and Reconnaissance
ISS	International Space Station
ITES	Information Technology Enabled Services
ITRF.	International Terrestrial Reference Frame
JAXA	Japan Aerospace Exploration Agency
KSA	Kenya Space Agency
KIIs	Key Informant Interviews
LEO	Low Earth Orbit
LOFAR	Low-Frequency Array
MDAs	Ministries, Departments and Agencies
MDGS	Millennium Development Goals
MEO	Medium Earth orbit
NASA	National Aeronautics and Space Administration
NASDRA	National Space Research and Development Agency (Nigeria)
NGO	Non-Governmental Organization
PAT	Participatory Analytical Techniques
R&D	Research and Development
REC	Regional Economic Community
SADC	Southern African Development Community
SBAS	Satellite Based Augmentation Systems
SDGs	Sustainable Development Goals
SKA	Square Kilometre Array
SSA	Space Situational Awareness
SST	Science Space and Technology
STEI	Science, Technology Engineering and Innovation
STI	Science, Technology and Innovation
TBC	To be confirmed



TT&C	Tracking, Telemetry and Command
UAV	Unmanned Aerial Vehicle
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNCTAD	United Nations Conference on Trade and Development
UNECA	UN Economic Commission for Africa
UNEP	United Nations Environment Programme
UNOOSA	United Nations Office for Outer Space Affairs
VHF	Very High Frequency
VLB	Very Long Baseline Interferometry
VSAT	Very Small Aperture Technology
AMESD	African Monitoring of the Environment for Sustainable Development
MESA	Monitoring of Environment and Security in Africa
GMES & Africa	Global Monitoring for Environment and Security and Africa

GLOSSARY OF TERMS

The following terms carry the meanings/interpretations ascribed below, throughout this EAC Regional Space Strategy Status Report.

“African Space Programme” means An African-led, well-coordinated and integrated space programme (system of space projects or services) that is responsive to the social, economic, political and environmental needs of the continent, as well as being globally competitive, and one that ensures that Africa is a responsible and peaceful user of outer space.

“Space Science” means A holistic study in all scientific disciplines that involve space exploration, natural phenomena and physical bodies occurring in outer space, e.g, astrobology, astrochemistry, astronautics, astrophysics, space medicine, among others. “Satellite Communication” means Artificial satellites placed in space for the purpose of telecommunications.

“Space Sector” means Distinct areas in the space industry. For example, The African Space Strategy focuses on Civilian and Commercial Space.

“Governance Structure” means the anatomy and inter-relationship of administrative and managerial processes that guide the decision-making chains of the EAC Regional Space Programme “Data democracy” means Provision of wider and easier access to geospatial data, software tools for manipulating data and capacity building, education and training.

“Data integrity” means Maintaining and assuring the accuracy and consistency of data over its entire life cycle “Earth observations” means Gathering of data and information about Earth’s physical, chemical, meteorological and biological systems using in situ, aerial and space-borne platforms to monitor and assess the status of, and changes in, the natural and built environment “Global navigation satellite system” means Constellations of Earth-orbiting satellites that broadcast their locations in space and time, of networks of ground control stations, and of receivers that calculate ground positions by triangulation.

“Navigation and positioning” means The determination of position and direction.

“Remote sensing” means Acquisition of information about an object or phenomenon without making physical contact with the object “Satellite communications” means Artificial satellites placed in space for the purpose of telecommunications

“Satellite systems” means Artificial objects comprising computer-controlled systems that attend to many tasks, such as power generation, telemetry, altitude control and orbit control. “Space exploration” means Exploration and discovery of outer space using a variety of technologies “International Partnerships” means Strategic engagement, cooperation or collaboration of African entities with any other associates outside the continent



CHAPTER ONE: INTRODUCTION

1.1 Background

The East African Community (EAC) is a regional inter-governmental organization comprising the Republics of Burundi, Kenya, Rwanda, South Sudan, the United Republic of Tanzania, and the Republic of Uganda. The Community aims to foster Regional Integration and socio-economic development among Partner States through development of policies and programmes to widen and deepen co-operation in political, economic, social and cultural fields including science, technology and innovation.

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human resources development, collaborative research, technology development and innovation. These regional STI priorities are to enable and support the sustainable production of goods and services and enhance economic competitiveness in accordance with the EAC Common Market Protocol of 2010 and the EAC Vision 2050.

Over the past decade, African investment in Space Science and Technology (SST) has grown, driven by Earth observation development programmes in Algeria, Egypt, Nigeria, Gabon, Kenya and South Africa, and investment in satellite telecommunications in countries such as Angola and Congo. According to the Business and Market Analysis of the African Space Industry study by Space in Africa, over US\$3 billion has been spent on space projects in Africa since 1998. Encouraged in part by the successful South African bid to co-host the Square Kilometer Array global astronomy project, the largest radio telescope to ever built, new entrants have emerged in the African space arena.

Today, increased spending and activities are driven primarily by African agendas linked to (sustainable) development goals, and with a few exceptions, National Space Programmes are largely financed through national budgets and not foreign aid, as popularly believed. In Sudan in September 2012, the Ministers of Science and Technology recommended in the Khartoum Declaration that the AU Commission develop a space policy for the continent in collaboration with relevant stakeholders and taking into account remote sensing applications and satellite imagery processing.

Following the Declaration, the AU Commission endorsed the establishment of a Working Group on Space Science tasked to develop a draft African Space Policy and Strategy.

Space Science and Technology, and the many practical benefits that can be derived from its application, have played a significant role in international, regional and national economic and social development efforts. Space presents a unique opportunity for cooperation in using and sharing enabling infrastructure and data towards the proactive Space-derived products and services in Earth observation, satellite communication, and navigation and positioning are crucial for the economic development of the EAC Region. While some of these products and services have helped to meet the social and economic needs of the continent, East Africa does not have the full technical knowhow to participate independently in these space-related activities.

New applications for Space Science and Technology are constantly being discovered,

and spin-offs from space technologies have led to advancements in such diverse fields as medicine, materials science and computers. Exploiting these applications and technological advancements for East Africa's social and economic development would bring many benefits. However, the high cost of participating in space activities has hindered many countries, particularly those in the East African Region, from taking full advantage of the practical benefits that SST offers.

The African Space Policy and Strategy were developed to support the AU Agenda 2063 objective of exploiting all SST available opportunities in the short, medium, and long term, to ensure positive socioeconomic transformation within the next 50 years. On the global scale, it serves the purpose to contribute to the elaboration of the variety of perspectives necessary to move forward the dial on more effective and inclusive global space governance. With a policy in place to facilitate increased regional cooperation, some of the historical limitations that have prevented successful Science and Technology Cooperation in the region will be averted.

The strategic approach in implementing the African Space Program, as proposed by the space policy, is to adopt a philosophy driven by addressing needs in response to relevant user requirements. The strategy focuses on priorities that underpin the key priority areas of political, economic, and social affairs, namely around disasters, health, ecosystems, biodiversity, and climate. However, Earth observation forms the primary focus of the African Space Program as this application is viewed to have the most potential to address the socio-economic challenges of the continent. Other focus includes Navigation, Communication & Science/Astronomy. There are other initiatives that have embraced African Space Program; these include AMESD, MESA, GMES & Africa, and African Group on Earth Observations (AfriGEOSS) which provide some distinct advice for the coordination of the African Regional Space Program, utilization of Earth Observation data in monitoring of Environment and Natural Resources in Africa. These programs have also implemented capacity building program that has built on the existing capacity to enable Member States enhance their scientific and technical knowledge and experience in space science and technology in addressing Africa's needs".

The EAC Regional STI Policy advocates for Space Science and Technology that shall help the EAC to develop the key core technologies of satellite communications and broadcasting regarding space/ground segments, transmission, Global Navigation Satellite System and its application technologies, integration with wireless networks

for applications to productive and social sectors. The EAC shall promote the use of Space Science technologies in accomplishing the following: remote sensing for natural resource monitoring and management; climate change and drought monitoring; timely natural disaster prediction and mitigation; rural and urban planning; land, sea and air navigation positioning applications and safety; telemedicine; e-learning; space weather monitoring and mitigation of potential threats; and Regional surveillance.

1.2 Rationale

Humanity is facing major challenges in ensuring the adequate provision of basic necessities, such as food, shelter, a clean and healthy environment and proper education for the growing population. East Africa can only hope to address these challenges through sustainable development or yet further challenges will arise.

Political, social and economic commitments will be effective only if there is a regional partnership for sustainable development and if the available resources are equitably allocated. Earth observation/remote-sensing satellites use state-of-the-art instruments to gather information about the natural resources and the condition of the Earth's interrelated land, sea, and atmospheric systems. Many EAC and African countries have to cope with large-scale disease outbreaks, and telemedicine may help to meet these challenges by improving the organization and management of remote health care delivery.

The EAC Regional Space Strategy aims to "create a well-coordinated and integrated EAC Outer Space Programme that is responsive to the social, economic, political and environmental needs of the continent, as well as its global competitiveness." It also aims to support the space initiatives of EAC regional programmes by assisting with regulatory frameworks and ensuring that space is used responsibly and for peaceful purposes. The EAC regional Space powerhouses will spearhead capacity building in areas such as satellite communications, navigation and positioning, earth observation and space science and astronomy. The fundamental to the success of the EAC Regional Space programme is the leveraging of satellite services to support development initiatives through activities such as monitoring of weather conditions, disaster mitigation, as well as boosting EAC Region's drought-prone agricultural sector.

EAC Region is critically reliant on space science and technology from other countries especially Europe and America. Space-based systems deliver information and

services that protect lives and the environment, enhance prosperity and security, and stimulate scientific, industrial and economic development. The EAC Regional Space Strategy will provide over-arching guidance for the development of appropriate space capabilities and utilization of space system applications to contribute to economic growth, reduction of poverty and the creation of knowledge. This strategy will also provide guidance to EAC Partner States public and private sector stakeholders in the space arena, to inform EAC participation in national, Regional and international space activities, and promote improved co-ordination and co-operative governance.

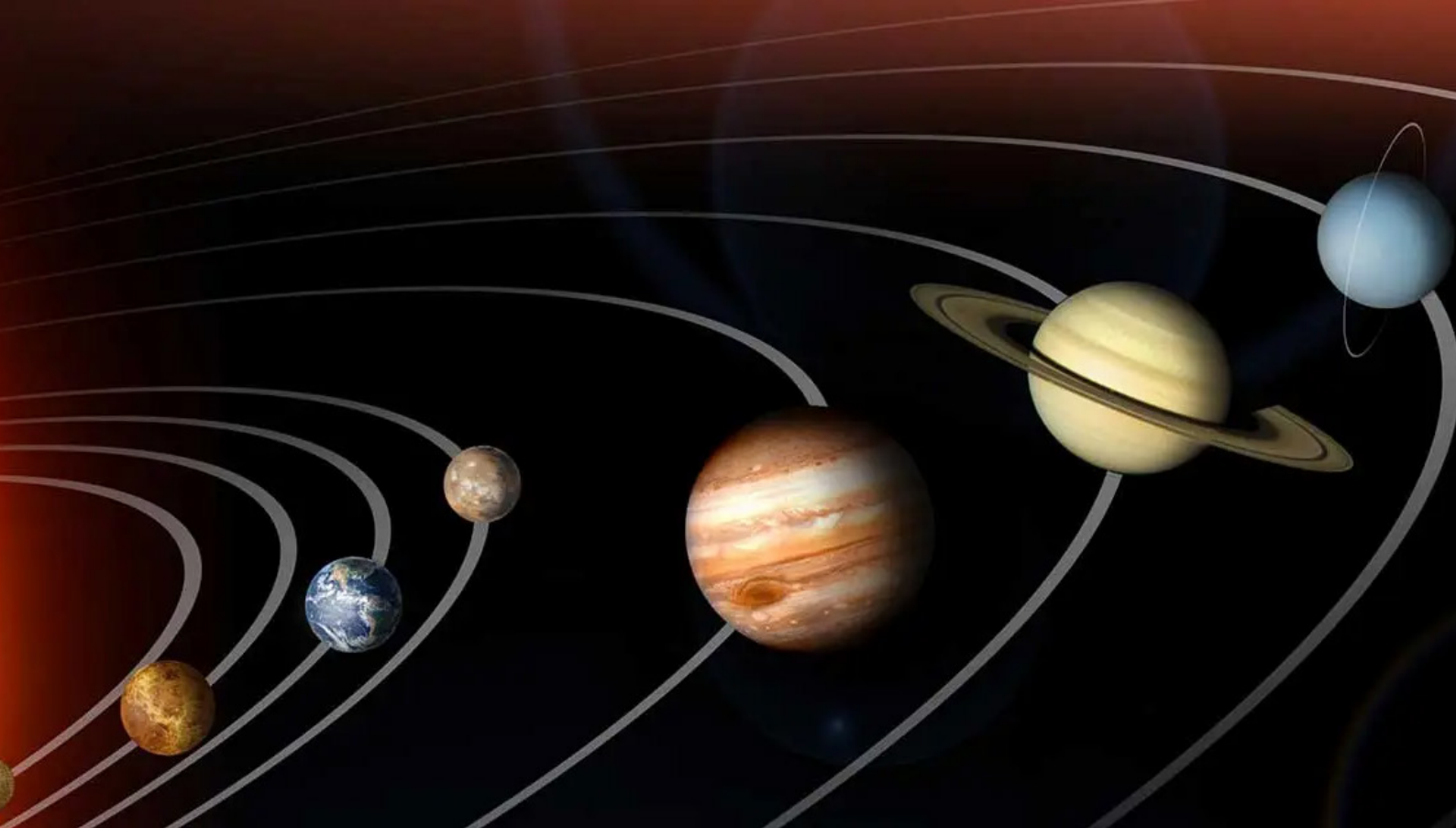
EAC Partner States will thus develop and maintain a robust set of space capabilities in order to meet their national requirements. These capabilities shall be supported by the necessary human capital, infrastructure, industrial base, and appropriate research and development activities. With this Regional Space Strategy, the EAC Partner States will be committed to being a responsible user of the space environment and will ensure that all public and private sector activities are conducted in accordance with appropriate international best practices and relevant international treaties. The promotion of a domestic space industry will be one of the cornerstones of the EAC Regional Space Strategy. This will be achieved by maximizing the participation of domestic industry in the regional EAC space agenda, and creating a supportive regulatory environment. The EAC Regional Space Strategy will encourage domestic industry to pursue appropriate strategic international industrial partnerships, as one of the means of enhancing industrial competitiveness.

EAC Regional Space strategy will pursue the capacity-building initiatives to ensure that EAC Partner States develop the requisite human capital to support national and regional space activities, including the development of space application products and services. The regional Strategy will also promote enhanced space awareness at all levels of society, as a means to build public understanding of the societal benefits of space science and technology. EASTECO will encourage Partner States to co-operate in respect of the mutually beneficial and peaceful uses of outer space, with a focus on extending the benefits of space technology to the EAC Region, through the pursuit of cooperative activities with other African countries.

The Regional Space strategy will aid satellite communication which is a key technology that could enable developing countries to participate in the build-up of global information infrastructure. Research indicates that satellite-based wireless systems are the most cost-effective way to develop or upgrade telecommunications networks in areas where user density is lower than 200 subscribers per square

kilometer. Such wireless systems can be installed five to 10 times faster and at a 50% lower cost than landline networks. Satellite television broadcasting is another important application of space technology, and will help in improving access to information and to make the East African voice heard worldwide. This Regional Space Strategy will be implemented through relevant government departments and agencies through coordination and co-operative governance, to optimize the use of resources whilst the EASTECO will monitor and evaluate that implementation. Lastly, EAC Regional Space Strategy will aim to leverage the use of GNSS to improve earth observation services for data-driven decision making in the pursuit of attaining socio-economic development for EAC Partner States. Regional powerhouses and institutions provide a strategic link for partnerships aimed at advanced cost and infrastructure sharing that ultimately creates value in the pre-existing GNSS and EGNOS programmes. GNSS is also being used, together with Earth observation applications, for the surveillance and monitoring of illegal shipping activities, such as unlawful fishing, oil spills and the ensuing environmental damage.

It's against this background that EASTECO proposes to develop the EAC Regional Space Strategy to create a well-coordinated and integrated EAC Outer Space Programme that is responsive to the social, economic, political and environmental needs of the EAC Region, as well as its global competitiveness.



CHAPTER TWO: SITUATIONAL ANALYSIS

2.1 Stakeholder Analysis

Noting the cross-cutting role of Space Science and Technology in driving socio-economic development various sectoral stakeholders are critical due to their role in the development and the implementation of the regional and national policies for Space Science and Technology. A stakeholder consultation of Space Science and Technology stakeholders was conducted in all the EAC Partner States. Stakeholder engagement was conducted through workshop sittings in the respective partner states; Burundi, Kenya, Rwanda, South Sudan, United Republic of Tanzania and Uganda. This method of consultation implored the use of quantitative and qualitative primary data collection methods as articulated in the study methodology, namely; Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs) that facilitated the incisive capture of information on the status of Space Science and Technology in the EAC Region. It is noteworthy that this approach was preferred in order to ensure the capture of quality primary information/data that can reliably contribute to the development of a robust and evidence-based EAC Regional Space Strategy. This section analyses the information/data emerging from stakeholder engagements in the Partner States and presents key findings on the current status of space science and technology in EAC region. The analysis was carried out with focus on synthesizing

a clear understanding of the prevailing Space Science and Technology situation. Key stakeholders according to their high level of influence and interest in STI include among others:

- I. National Space Agency;
- II. Partner States Governments and National Science, Technology and Innovation Agencies and Institutions;
- III. the Private Sector in space science and technology, Space Science Professional Bodies, Academia and Research Organisations;
- IV. International Space Organisations, Development Agencies and Partners. The relevant stakeholder for Space Science, Technology and Innovation are presented in figure 1 below according to their influence and interest in Space Science and Technology. The level of influence or power expresses the degree of ability, authority or involvement to help or guide the development and the implementation of Space Science and Technology Strategy, while the level of interest reflects the degree of support or opposition to Space Strategy objectives.

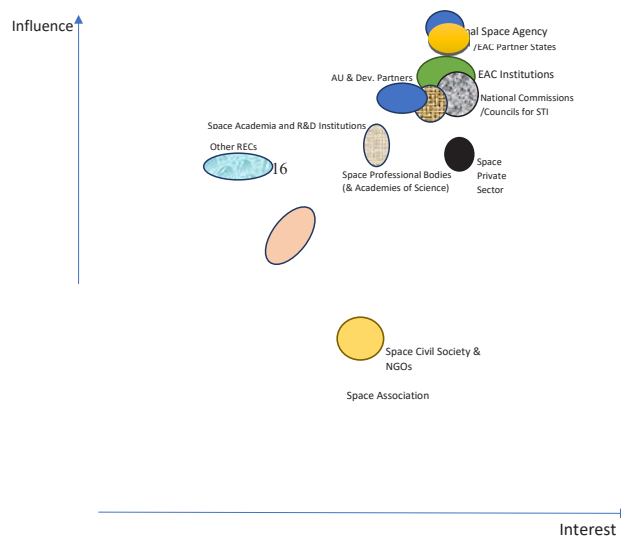


Figure 1: Stakeholders' Level of Influence and Interest in the Development and Implementation of the EAC Space Strategy (High/Medium/Low)



2.2 The State of Space Science and Technology in East Africa

This section examines and elucidates the current scope of current space science and technology initiatives or programs within the partner states. This highlights the key actors and institutions leading the initiative as well as the core mandate and deliverables. All the partner states in the EAC Region, except Republic of Burundi and Republic of South Sudan have demonstrated some effort towards their respective country specific space programs.

2.2.1 Republic of Kenya

Kenya was among the pioneers of the African space sector thanks to long-lasting ties with Italy. In 1964, Kenya opened the San Marco Space Centre, a Satellite Launching and Tracking Base, in collaboration with Sapienza University of Rome (Italy) and NASA. The launch facility was operational until 1988, cumulating 27 rocket launches (primarily sounding rockets) and 9 satellites launches. It was ideally situated, being close on an equatorial latitude and bordered by the Indian Ocean. Ground operations of the centre are still active, mostly for NASA and ESA's satellites communications and tracking. The centre was renamed Centro spaziale Luigi Broglio in 2004. In 2009, National Space Secretariat (NSS) was created. It was replaced in 2017 by the Kenya Space Agency (KSA). Kenya's first satellite, 1KUNS-PF, was launched in 2018 from the ISS. It was a 1U CubeSat, developed since 2015 and assembled by the University of Nairobi with the technical support of the JAXA, Sapienza University of Rome and Italian companies. It was fully financed by the JAXA and the Italian Space Agency. 1KUNS-PF deorbited in 2020.

The Centro spaziale Luigi Broglio (formerly San Marco) is Kenya's main space asset. It is jointly exploited with Italy. Its current activities include:

- a. National programs: telemetry tracking and control of satellites (AGILE, SWIFT, NuSTAR)
- b. Tripartite activities: support of ESA with Kourou launches

1 EU Global Action on Space Market Report Africa Issue 1 – January 2022
Space Association Space Civil Society & NGOs Interest

- c. Third-party activities: support of Chinese missions (Shenzhou and Tiangong), Kongsberg Satellite Services, ASNARO Launch and Early Orbit Phase (LEOP) KSA's Strategic Plan includes several projects, which include:
- d. Participation in the Africa Regional Data Cube (ARDC): platform containing 17

years of satellite imagery, currently available for Kenya, Ghana, Senegal, Sierra Leone, and Tanzania. It is currently used to monitor forest cover, land change, water quality, illegal mining, etc.

- e. Rollout of the Global Learning & Observations to Benefit the Environment (GLOBE) project promoting the uptake of space-related subjects and connects stakeholders from the public and private sectors
- f. Development of a Space weather monitoring network, aiming to provide real-time monitoring of space weather to mitigate events affecting communications, navigation, etc.
- g. Development of a Satellite Imagery Analysis Portal with geospatial data management & analysis software
- h. Launches: Italian nanosatellites and mini-rockets launching from high-altitude balloons – expected late 2021

Key findings on sectors that could benefit from Space include: Agriculture which contributes 28% to Kenya's GDP – The sector already benefits from EO applications, for example through the ESA Food Security Thematic Exploitation Platform; Kenya is strengthening natural resources protection, including forest and halieutic resources, through the involvement of several public bodies; and Earth Observations can help in monitoring and enforce protective measures. A smartphone app for information spreading is also being developed According to the EU Global Action on Space, with focus on Kenya, the opportunities in Kenya are mostly upstream and have a medium potential. The current growing areas include: Satellite systems: Kenya has to build a satellite for the Africa Resource Management Constellation (ARMC). Additionally, satellite communication is one of the main programmes of KSA's strategic plan. It has so far little experience in satellite design and manufacturing and limited funding. Other satellites could be built through university projects; Ground stations: besides Malindi, additional ground infrastructure needs may emerge corresponding to new upstream infrastructure; Data storage and dissemination: Kenya intends to build a satellite Imagery Analysis Portal and participates in the Africa Regional Data Cube (ARDC). It has a limited experience of satellite data management, especially on the public side; and Agriculture & natural resources exploitation represents 28% of Kenya's GDP. Agriculture modernisation and protection of natural resources (e.g., monitoring illegal fishing) are critical to Kenya's economy. The country is already investing in associated downstream solutions On 12th December 1970, the first satellite specifically designed for X-ray astronomy, Small Astronomical Satellite 1, was launched from the San Marco Platform in Malindi.



This National Aeronautics and Space Administration (NASA) satellite was christened "Uhuru" to commemorate the seventh anniversary of Kenya's independence and in recognition of the hospitality of the Kenyan people. Uhuru was a scanning mission that performed the first comprehensive survey of the entire sky for X-ray sources.

In 2009, the National Space Secretariat (NSS) was established as the precursor to the Kenya Space Agency, to be the central coordinating body for all space related activities. The Agency was eventually established in 2017 with the mandate to promote, coordinate and regulate space related activities in Kenya. Kenya's first satellite named 1st Kenya University Nano Satellite - Precursor Flight (1KUNS-PF) - was deployed into orbit from the International Space Agency on May 11, 2018.

This is part of the capacity building and research programmes in space science and technology currently conducted in Kenyan universities. Kenya Space Agency developed strategic Plan 2020 – 2025 with a mission of coordinating, nurturing and developing Kenya's space sector to maximize the utilization of space opportunities. The strategic plan provides a clear roadmap and firmly anchors Space science, technology and related applications as key drivers for development in tandem with the national aspirations, political, social, and economic goals.

KSA is mandated to promote, coordinate and regulate space related activities in the country. This will be achieved through promotion of research and innovations in space science, technology and respective applications as well as enhancing the regulatory framework. It will also spur Kenya's competitiveness and positioning in playing a critical role in the regional and global space agenda. The following initiatives are being executed under the auspices of KSA. These include:

- a. Satellite Imagery Analysis Portal: Developing Open Data Cube to help address the needs of satellite data users, giving them a better picture of their land resources and land change;
- b. Project MIDST: Monitoring for Information and Decisions using Space Technologies (MIDST) is a project premiered by the Kenya Space Agency to utilize earth observation data which is analyzed and used to generate products used in reporting and decision making;
- c. Research Grant: The research grant is a year round program with the intent of involving universities in the social-economic development by promoting capacity building while creating linkages between academia and industry; and Space Club: This is an outreach program to promote and sustain interests in Space and Geo-STEAM subjects.

2.2.2 Republic of Rwanda

Rwanda's space activity is recent. The country owns two satellites launched in 2019, one dedicated to Earth Observation, the second dedicated to Communications. Rwanda's first satellite, RwaSat-1, is a 3U Earth Observation CubeSat. It was deployed from the ISS in 2019. The satellite was developed thanks to cooperation with

JAXA. It was designed and built in Japan (University of Tokyo) since 2017 with the participation of three Rwandan engineers. It is equipped with multispectral cameras and is primarily used by the Ministry of Agriculture to monitor soil moisture and crop yields. Rwanda's second satellite is called Icyerekezo. It is a 150 - kilo communication satellite, put in orbit in 2019 thanks to an agreement with OneWeb. It was built in Toulouse (France) by Airbus DS and launched from Kourou. Rwanda is not the owner of the satellite but an exclusive user. Rwanda's Ministry of Telecommunications uses it as a platform to provide high-speed Internet free of charge to the rural educational centres of the island of San Pierre Nkombo in Lake Kivu.

The Rwanda Space Agency (RSA) was created in 2020 and put under the direct authority of the President of the Republic. According to the Chamber of Deputies, RSA's role is the "coordination of Rwanda's space sector activities geared towards securing communication, Intelligence, Surveillance and Reconnaissance (ISR) as well as purchasing and playing a custodian role of national spatial data and imagery." It seeks to develop foreign partnerships (e.g., with the US or Israel) and direct space activities to provide government institutions with satellite communications and remote sensing data. The current tasks undertaken are: Training of a pool of technicians with institutions in the US, Japan and Israel; Establish ground infrastructure to receive satellite data and images: the first ground station is planned to be installed in the Rwamagana (60 kilometres from Kigali), thanks to cooperation between the local company Ngali Holding and the American satcom company GlobalStar Rwanda Government established Rwanda Space Agency (RSA) in 2021 with the mission of developing Rwanda's space sector towards social-economic development.

RSA is mandated to regulate and coordinate all space activities in the country while also creating an environment that promotes entrepreneurial and industrial development to enable the creation of commercializable products that are globally competitive for local consumption and export markets.

Other key objectives of RSA include designing and implementing capacity building programs in space sciences and technologies, their applications and to build highly skilled professionals in space industry. This is implemented through various



partnerships with different stakeholders.

RSA is working on building a National Geospatial Data Hub that will aggregate geospatial data with some of the existing data to provide information that could be used to monitor how we are standing in the implementation of key policies at the national and international levels.

For RSA to achieve the mission, there was a need to first understand the needs of stakeholders in terms of space-related services. To this end, RSA approached different institutions to understand how space services can contribute to enhance and monitor service delivery in specific sectors. It is against this that RSA initiated few projects using geospatial data and satellite imageries that are received from partner satellite operators. With the received data, RSA will use algorithms and machine learning processes to extract useful information, which can be applied in key sectors for the country such as Agriculture, Mining, and Disaster Management, among others.

According to the EU Global Action on Space, with focus on Rwanda, the business opportunities have a low to medium potential – They include satellite systems and defence and agriculture applications upstream and have a medium potential. The current growing areas include

- a. Satellite systems: Rwanda has purchased a satellite from Airbus DS, put in orbit in 2019. It has expressed other needs such as Intelligence, Surveillance and Reconnaissance (ISR), which could be filled by another foreign-built satellite purchase
- b. Agriculture and natural resources exploitation: the mining sector is a significant contributor to Rwanda's GDP. The government has ambitious plans to increase production and develop exports. Resources mapping is critical; a partnership with Chinese actors exist. Agriculture has been the focus of modernisation plans for the past decade. Satellite-based use-cases can be developed
- c. Poverty reduction: Rwanda is investing in poverty reduction policy (e.g., the Economic Development and Poverty Reduction Strategies). This implies agricultural modernisation, poverty mapping and measure of policy efficiency.

Stable SST application areas include: Ground stations: Rwanda is currently unrolling a ground station project with the American Global Star, to receive satellite data. Others could follow, as satellite utilisation will increase; and Mobility, infrastructure, transport.

2.2.3 Republic of South Sudan

South Sudan gained its independence from Sudan (Republic of the Sudan) in 2011. There is no record of any involvement of South Sudan in space-related activities. South Sudan does not have a national space agency. No space programme is mentioned in the government's ministries' missions. The government has no official plan for space development. Universities of South Sudan do not seem to have any space dedicated programmes. There currently are no companies with space activity.

2.2.4 United Republic of Tanzania

Tanzania is considered one of the pioneers of the development of space exploration and Earth observation in Africa.³ Despite the pioneering status, Tanzania does not have a national space agency. No space programme is mentioned in the government's ministries' missions. The government has no official plan for space development.

Tanzania universities do not seem to have any space dedicated programmes. There currently are no companies involved with SST related activities. One of the earliest initiatives was the joint program spearheaded by the Directorate of surveys and mapping, Tanzania, Ardhi University in collaboration with three countries in developing the interim results of independent solutions of the very first official computation for The African Geodetic Reference Frame (AFREF); a unified geodetic ³ <https://spacegeneration.org/regions/africa/tanzania>

⁴ EU Global Action on Space Market Report Africa Issue 1 – January 2022

reference frame for Africa, fully consistent and homogeneous with the International Terrestrial Reference Frame (ITRF).

The natural occurrences of space related phenomena in Tanzania have greatly influenced our interests for space exploration. For instance, Tanzania is home to one of the world's largest meteorites to ever hit the Earth's surface. Located in Mbozi district, Mbeya, the meteorite was discovered in 1930 and it measures 3 meters long, 1-meter-high, and weighs an estimated 16 metric tons. Also, astronomical experts describe Tanzania's geographical positioning as the most suitable in support of space exploration activities.

Despite lack of a mandated entity to drive the country's SST agenda, initiatives relevant to the subject matter have been established by volunteers and well-wishers across the SST domain. These include: Astronomy and Space Science Association of Tanzania; University of Dodoma; Mugabe Secondary School; Mt. Meru Astronomical observatory and Organization for Science, Education, and Observatory (OSEO) in Meru District.⁵



2.2.5 Republic of Uganda

Notwithstanding fruitless efforts in the 1970s, Uganda's space programme resumed in 2019 after Uganda's President Museveni pushed for space exploration during a meeting with the Russian-Ugandan Intergovernmental Commission on Economic Scientific and Technological Cooperation. The country reiterated its ambition in a bilateral meeting with President Museveni and Russian President Putin during the 2019 Russia-Africa summit. Later in 2019, The Ministry of Science, Technology and Innovation (MoSTI), launched its first satellite in orbit from Japan. The Ugandan cabinet also approved constructing a ground station at the Mpoma facility (near Kampala), where Uganda already has existing antenna infrastructure used by Intelsat (US) for telecommunication services. Russia will support the project. The space programme will share facilities with Kiira Motors, the country's flagship state-owned automotive producer, in its manufacturing location in Jinja, east of Kampala. An agreement has allegedly been reached between Airbus DS and Uganda to build and launch its second EO satellite in 2023. Uganda's space budget was under EUR 1m over 2019- 2021. For 2021-22, MoSTI requested a budget for space of USD 4.5 m In 2021, Uganda's cabinet identified seven (7) benefits of the space programme that serve as its justification. They can be summarised as: increasing security for Uganda and stabilizing East Africa through cross-border movement monitoring and surveillance of the region, industrial development for the private sector through research and innovation to drive new technologies and attract foreign investments, Earth Observation capabilities to address global development challenges (e.g. climate change), becoming a major space player in the region, and increasing human resource capacities to facilitate the development of space technology in the country.

To advance space education, Uganda established a space technology programme at Makerere University. The country also explores the possibility to develop a space camp, through a potential collaboration with CERN. The International University of East Africa (IUEA) applied in 2020 to the government of Uganda to build an educational satellite called UGA SAT 1. Uganda has also sent three (3) scientists to the Kyushu Institute of 5 <https://www.africanastronomicalsociety.org/solar-eclipse-2020/contact-information/> 6 <https://mmao.space/>.

Technology for training purposes in the Japanese BIRDS-5 project. Private space sector is limited. Company Space Technology agency focuses on nano satellite manufacturing. Companies EagleCORS and Suvnet are operating multiple GNSS CORS stations in the country.

According to the EU Global Action on Space, with focus on Uganda, the business opportunities lie in transport and logistics downstream SST applications. The current growing areas include

- a. Transport & logistics: total infrastructure funding represents c. 30% of the Ugandan Government's total budget. Transportation infrastructure is a major focus of the Ugandan government, including road, rail, aviation, and water transport.
- b. Satellite systems: Uganda has strong space ambitions. It currently works on its 1st satellite, Pearl Sat 1 (launch planned 2022) and has allegedly ordered an EO satellite from Airbus DS. There are possible new domestic developments & foreign satellite purchases.
- c. Ground station: Uganda is investing in midstream capabilities, as illustrated by the approval for the construction of a ground station in 2021
- d. Defence & Security: Uganda intends to improve the stability of the East African region, partly thanks to ore sustained monitoring of the territory and cross-border activity.
- e. Critical infrastructure: energy, health and ICT infrastructure are also core focuses of the Ugandan government. For example, several hydro and solar power plants totalling a little under 1GW will be added to the national grid in the coming years.
- f. Agriculture and natural resources exploitation: the agricultural sector contributes to over 20% of the Ugandan GDP. The "Uganda Vision 2040 plan" aims to enhance agriculture productivity. Actions include improving access to information and weather information.

The Uganda Vision 2040 provides for the Science, Technology Engineering and Innovation (STEI) Sector to expedite the development of the space industry as well as Space Science and Exploration programmes in Uganda. This, coupled with strategic guidance by His Excellency the President to the STEI sector in March 2017, informed the establishment of the UNSP. The Program has been captured as one of the core government initiatives under the Third National Development Plan (NDP III) 2020/21 – 2024/25; which also doubles as Phase 1 implementation of the Program.

Importantly, the Cabinet of Republic of Uganda on its sitting of March 22, 2021 approved the Program opening the door for government commitment to mobilise funding to fast-track the implementation.

The program and wide development of Uganda's Space industry and economy has been aligned to support Uganda's national and international commitments including Africa Union 2063 Agenda's Science Technology and Innovation Strategy for Africa

(STISA-2024), African Space Policy and Strategy, and the UN 2030 Agenda for Sustainable Development, and in particular, the SPACE4SGDs initiative being spearheaded by the United Nations Office for Outer Space Affairs (UNOOSA).

The goal is to develop Uganda's space capabilities to leverage SST for sustainable industrialization and development through establishing requisite SST infrastructure; establishing and equipping a Space Science and Technology Research Institute/ Centre; developing local human resource and research capacity in SST; designing, building and launching satellites for different applications; increasing awareness, access and utilization of SST enabled products and services in Uganda; and establishing appropriate policy, legal, regulatory and institutional framework.

Uganda, through the Ministry of Science, Technology and Innovation (MoSTI) has undertaken several key interventions, which include:

- a. Initiation of the Development of the Uganda National Space Policy;
- b. Conducting of a national assessment of the SST training and education, infrastructure and application requirements;
- c. Initiation of a Uganda National Space Program Framework;
- d. Training and capacity building support initiatives towards Ugandan Space Scientists and Engineers in countries such as Japan and Russia;
- e. Development of two CubeSats ongoing, with first one expected to be launched in 2022
- f. Initiated bilateral cooperation frameworks with South Africa, Japan, Russia, Israel;
- g. Participation in the Africa Development Satellite Initiative, a six membered platform comprising: Uganda, Kenya, Nigeria, Ghana and Sudan; and Egypt.

2.2.6 Republic of Burundi

There is no record of any involvement of Burundi in space-related activities. Burundi does not have a national space agency. No space programme is mentioned in the government's ministries' missions. The government has no official plan for space development. Universities of Burundi do not seem to have any space dedicated programmes. There currently are no companies with space activity.

2.3 Strength, Weakness, Opportunities and Threats (SWOT) Analysis

This section examines the Strengths, Weaknesses, Opportunities and Threats Analysis (SWOT) in respect to Space Science and Technology within the partner states. This examination will guide the EAC Regional Space Strategy development process in highlighting the focus areas that the strategy should embrace. SWOT analysis of Space Science and Technology in EAC is provided in Table 1 below.

Table 1: SWOT Analysis of partner states situation in respect to Space Science and Technology.

Strengths	Weaknesses	Opportunities	Threats
<p>a. Political Will b. Partnerships and collaborations c. Existing expertise (start-up) in SST d. Existing Institutional Initiatives for space e. The availability of national, regional and international related frameworks</p>	<p>a. Insufficient expertise b. Disparities in expertise and capabilities at the region c. User needs not well quantified and documented d. Lack of enabling policies e. Limited funding + competing priorities f. Inadequate awareness and knowledge on space g. Inadequate pace infrastructure h. Lack of space technology products and services for environmental and resource monitoring i. Limited access and control of our outer space and resources</p>	<p>a. Strategic geographic location b. Various application areas c. Advanced initiaturing of Technology (convergence) d. Young population that can easily be trained into SST e. Existing regional and national space programs to learn from f. Existence of otential internal and external market for SST products.</p>	<p>a. Brain drain b. Competition for radio spectrum frequency c. Cyber security (threats) d. Political instability e. Over eliance on external financial and technical support f. Willingness to participate in regional initiatives g. Few or non-existent private sector players in the space technology h. In adequate of financial resources</p>



2.4 EAC Regional Legal Frameworks for Space Science and Technology

This section presents the findings of literature review on the role of SST in existing EAC Regional Treaty, vision, protocols, policies, strategies and plans, for purposes of informing and guiding the EAC Regional Space Strategy development process.

2.4.1 EAC Treaty

The East African Community (EAC) lays emphasis on developing policies and programs aimed at widening and deepening co-operation among the Partner States.

Specifically, Article 5 (1) of the Treaty states the objectives of the Community as: “to develop policies and programs aimed at widening and deepening co-operation among the Partner States in political, economic, social and cultural fields, research and technology, defence, security and legal and judicial affairs, for their mutual benefit.”

To attain these objectives, the Partner States committed themselves to establish a Customs Union, a Common Market, a Monetary Union and ultimately a Political Federation. These institutional arrangements are expected to promote balanced development and equitable distribution or sharing of economic benefits arising out of economic and political integration. The EAC Treaty provides an elaborate legal framework for cooperation in the areas of science and technology. By so doing, the Treaty not only sets the agenda in this area, it also outlines a set of common principles and undertakings by the partner states in designing their national science and technology policy priorities and programs. Chapter 16 of the EAC Treaty provides for cooperation by the Partner States in the areas of human resources, science and technology. Under article 102 dealing with human resources development, the Partner States commit to cooperate in a wide range of issues including coordination of human resources development policies and programs; establishing common research and training institutions; cooperation in industrial training, and harmonization of the education curriculum, among others. In article 103 of the Treaty, the Partner States restate their recognition of the fundamental importance of science and technology in economic development. The Treaty outlines a number of strategic actions that are relevant to STI. These are promotion of industrial research and development; the transfer, acquisition, adaptation and development of modern technology; establishment of joint industrial institutions and other infrastructure facilities; and dissemination and exchange of industrial and technological information.

The EAC identifies the widening and deepening of co-operation among Partner States in Science, Technology and Innovation (STI) as a key objective of the Community. SST is a critical sub-set within the wider Regional STI ecosystem that the Partner States can leverage on as a potential contributor to socio-economic transformation.

2.4.2 EAC Vision 2050

The EAC Vision 2050 was set to provide a road map that will enable the transformation of the region into an upper-middle income region within a secure and politically united East Africa, based on the principles of inclusiveness and accountability. The vision seeks to widen and deepen economic, political, social and cultural integration, in order to improve that quality of life of the people of East Africa.

The Vision is anchored on five core pillars. These pillars are integral to the very idea of long-term transformation, value addition and growth needed for accelerating momentum for sustained growth over the long term. The pillars are Infrastructure development; Industrialization; Agriculture, food security and rural economy; Natural resource and environment management; and Tourism, trade and services development. In realizing the selected pillars of development, the integration of SST presents a great opportunity to realizing the vision. The EAC Vision 2050 is further informed by the aspirations of the Africa Union (AU) Agenda 2063. The aspirations as outlined in the SST relevant aspirations of AU Agenda 2063 include:

2.4.3 Science, Technology and Innovation Strategy for Africa 2024 (STISA-2024)

The STISA - 2024 was developed during an important period when the African Union was formulating a broader and long-term AU Agenda 2063. The STISA - 2024 was 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, mining, security and water among others. The strategy is firmly anchored on six distinct priority areas that contribute to the achievement of the AU Vision. These priority areas are:

Eradication of Hunger and Achieving Food Security; Prevention and Control of Diseases; Communication (Physical and Intellectual Mobility); Protection of our Space; Live Together- Build the Society; and Wealth Creation.

The priority Area focusing on protection of our space under STISA-2024 aspires to effectively utilize the potential benefits of SST to collectively address socio-economic



development issues through derived applications such as: Earth Observation, Navigation and Positioning; Satellite Communication; Space Science; and Astronomy.

It further provides a platform for Member States to cooperate and share the enabling infrastructure and data and jointly manage programmes of mutual interest such as disease outbreaks; natural resources and the environment; hazards and disasters; weather forecasting (meteorology); climate change mitigation and adaptation; marine and coastal areas, agriculture and food security; peacekeeping missions and conflicts Earth Observation and Monitoring of Africa's abundant natural resources, including minerals, and biodiversity (and associated indigenous knowledge), are important for conserving the welfare of current and future generations. Currently, there is a need to address the huge gap in terms of the requisite infrastructure and critical human resources at all levels to fully realize the potential benefits that would accrue from the sustainable use and conservation of these resources. Strengthening a robust SST ecosystem at national, and regional and continental levels is paramount.

2.4.4 National Visions, Development Plans and other Strategic Frameworks of the Partner States

The EAC Vision 2050 is further informed by the National Vision Statements, Development Plans and other Strategic Frameworks of the Partner States.

Table 2 Partner States and their Vision Statements

Partner State	Vision Statement	Space Science and Technology Implied Related Priority Areas
Burundi Vision 2025	"Sustainable peace and stability, and achievement of global development commitments in line with Millennium Development Goals (MDGS)".	Pillar 3: Economic growth Pillar 7: The Management of Territory and Urbanization Cross cutting issue (s): Science and Technology; and the environment ⁷
Kenya Vision 2030	"Globally competitive and prosperous Kenya with a high quality of life".	The economic, social and political pillars of Kenya Vision 2030 is anchored on selected foundations, some of which are related to the

		potential applicability of SST. These include: infrastructure; energy; science, technology and innovation (STI); land reform; human resources development; and security. Three key sectors among the six identified to deliver the 10 per cent economic growth rate per annum envisaged under the economic pillar that can benefit from the SST application include: tourism; agriculture; and manufacturing. ⁸
Rwanda Vision 2050	“The Vision 2050 sets a new pathway that will lead the country to the living standards of upper middle income by 2035 and high income countries by 2050. The Vision 2050 has overarching objectives of promoting Economic Growth and Prosperity and High Quality of Life for Rwandans”.	Pillar 1: Human Development Pillar 2: Competitiveness and Integration Pillar 3: Agriculture for wealth creation
South Sudan Vision 2040	“Towards Freedom, Equality, Justice, Peace and Prosperity for All”.	Pillar 2: building a prosperous, productive and innovative nation Pillar 6: building a safe, secure and healthy nation
United Republic of Tanzania Vision 2025	“High quality of life anchored on peace, stability, unity, and good governance, rule of law, resilient economy and competitiveness. It envisages to become a middle-income country with high level of human development”.	All action points under the competence and competitiveness as a driving force towards achievement of the Vision 2025, relate well with opportunities presented by SST as a core delivery.



Uganda Vision 2040	Transform Ugandan society from peasant to a modern prosperous country.	The opportunities identified that can benefit from the integration of SST over the vision period include; Tourism, Agriculture, Oil and Gas, Minerals, Industrialization, Knowledge and ICT, and Water Resources. The vision further identifies strategic fundamentals for development, which again, can benefit from a supported SST sector. These include; Human resource, Transport infrastructure and services, Energy, Science, Technology, Engineering and Innovation, Urban Development, Land and Peace, Security and Defence
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2.4.5 EAC Treaty and Protocol

The Treaty on the Establishment of the EAC and the its subsequent Common Market Protocol, have conferred significant prominence to STI as a driver for economic growth in Partner States, particularly under: Article 42, on Cooperation in Research and Development (R&D) and Article 44 on Cooperation in Industrial Development. Article 42 of the EAC Common Market Protocol, Research and Technological Development, requires Partner States to promote research and technological development through market led research, technological development and the adaptation of technologies in the Community, to support the sustainable production of goods and services and enhance international competitiveness. To this end, the Partner States have undertaken to:

- a. Disseminate the results of activities in research, technological development and demonstration programmes;
- b. Facilitate access to their technological and research facilities by researchers and other experts;
- c. Encourage private sector participation in activities relating to intra-regional research and transfer of technology;
- d. Adopt measures to develop the human resource of the Community in research and development;
- e. Establish and support research infrastructure, facilities and institutions;

- f. Collaborate with the East African Science and Technology Commission and other institutions on research, science and technology; and g. Establish a mechanism for the coordination of the activities specified.

Article 44 of the EAC Common Market Protocol, Co-operation in Industrial Development, requires Partner States to cooperate in the area of industrial development in the activities related to the production of goods and services in the Common Market, for the attainment of sustainable growth and development in the Community.

Accordingly, partner states are called upon to undertake the following SST related interventions: Promote linkages among industries and other economic sectors within the Community; Promote value addition and product diversification to improve resource utilisation; Promote industrial research and development, transfer, acquisitions, adaptation and development of modern technology; Promote sustainable and balanced industrialisation in the Community to cater for the least industrialized Partner States; Facilitate the development of micro, small and medium industries and promote indigenous entrepreneurs; Promote investment and employment opportunities in the Community; Promote knowledge based industries; Promote industrial productivity and competitiveness of industries at national, Community and international levels; Promote sustainable industrial development that ensures environmental protection, management and efficient resource utilisation; and Disseminate and exchange industrial and technological information. Article 103 (1a) of the EAC Treaty, on Science and Technology, further recognises the fundamental importance of science and technology in regional economic development. In this regard, Partner States have committed to promote cooperation in the development of science and technology within the Community of which space science and technology is one of the critical components of regional ST&I aspirations.

2.4.6 EAC Sectoral Policies, Strategies and Plans

This section examines and elucidates the extent to which SST is currently linked to and/or integrated into the EAC sectoral policies, strategies and plans. The following EAC Sectoral Policies, Strategies and Plans are relevant to informing EAC Regional Space Strategy Development process.

2.4.6.1 Protocol on the Establishment of the EASTECO

The Protocol on the establishment of the East African Science and Technology Commission (EASTECO) was promulgated in 2007. Article 5 of the Protocol, on



Objectives, requires EASTECO to promote and coordinate the development, management and application of science and technology to support regional integration and socioeconomic development in the partner states. The establishment of an effective EAC Regional Space Strategy is a critically lacking pillar in the effort to achieve EASTECO's specific objectives.

EASTECO's specific objectives are to promote: Cooperation in the development of regional science and technology policies; Joint development and application of science and technology for the Community; Cooperation in joint research and development in science and technology; Joint mobilization, utilization, management and development of resources, both material and human, for the development of science and technology in the community; Development, adoption and utilization of information and communication technology, as well as the adoption of new and emerging technologies; Promote scientific and technological innovation and invention within the Partner States; and Cooperation with organizations with similar objective.

Furthermore, the formulation of the EAC Regional Space Strategy will contribute towards achieving some of EASTECO's core functions, notably to:

- a. Formulate the policies of Commission, Article 6, Clause (2a);
- b. Formulate policies that shall safeguard the region from hazards that might result from research activities and application of science and technology, Article 6, Clause (2h);
- c. Promoting the use and development of indigenous knowledge and technology, Article 6, (2l);
- d. Facilitate the dissemination and internalization of new and emerging technologies, Article 6, (2m);
- e. Promote and coordinate the public and private sector partnerships in the development and application of science and technology, Article 6, Clause (2n);
- f. Promote the development of regional research centres of excellence, Article 6, Clause (2o);
- g. Promote the inculcation of a science and technology culture in the Partner States, Article 6, Clause (2p);
- h. Establish and coordinate the implementation of common ethical guidelines for research and its application in the community, Article 6, Clause (2q);
- i. Promote the exchange and utilization of scientific information, Article 6, Clause (2r); and
- j. Support the dissemination of research and development findings in the Partner States, Article 6, Clause (2r).

2.4.6.2 EASTECO Strategic Plan (2017/18 - 2021/22)

The main objective of the EASTECO Strategic Plan (2017/2018 – 2021/2022) is to create an enabling environment for increased investment in Science, Technology and Innovation (STI), in order to support sustainable regional development and socio-economic transformation. The plan is not explicit on SST but it is implied in the efforts to establish a robust STI Regional policy framework.

2.4.6.3 EAC Regional ST&I Policy 2022

The main objective of the policy was to create an enabling environment for increased investment in Science, Technology and Innovation in order to support sustainable regional development and socio-economic transformation.

The policy identifies Space Science and Technology as one of the key priority areas, the STI ecosystem ought to strengthen. The other priority areas can benefit largely from having a vibrant SST base, such include Agriculture; Health and Life Sciences; Human Resource Development/ Education; Infrastructure Development; Energy; Information and Communications Technology (ICT); Industrialization and Trade; Environment and Natural Resources Management; Climate Change; Traditional and Indigenous Knowledge

It is anticipated that SST will help the EAC Region develop core competencies in core technologies of satellite telecommunications and broadcasting regarding space/ ground segments; transmission; advanced services; Global Navigation Satellite System and its application technologies; integration with wireless networks; and applications to other industrial sectors. The application of SST will include among others remote sensing for natural resource monitoring and management; climate change and drought monitoring; timely natural disaster prediction and mitigation; rural and urban planning; land, sea and air navigation positioning applications and safety; communications; telemedicine; e-learning; space weather monitoring and mitigation of potential threats to technological systems; Regional surveillance; earth and space sciences; earth observation and environment; aerospace engineering, nanotechnology; and New Product/ Production Technologies.

The first Strategic Policy Objective that focuses on SST seeks to build space science and technology capability for regional development Strategies to implement policy include the following:

- i. Assess existing regional infrastructure and capacity for space science and technology
- ii. Build and enhance regional capacity for space science and technology



- iii. Increase knowledge and understanding in all aspects of space science and technology and engage and partner with regional and international networks in space science and technology
- iv. Apply space science and technologies to socioeconomic development
- v. Establish a regional space agency
- vi. Support international actions and programmes on space science and technology.

The second Strategic Policy Objective, will aim at providing improved product and service delivery in monitoring and protection of the natural resource management and environment, land administration, management and control, regional defence and security services, communications and navigation, disaster monitoring and relief, hazards forecasting and early warning systems, transport monitoring, food security, and mineral exploration and prospecting Key action points to implement this objective will include the following;

- i. Build capacity in space science and technology
- ii. Develop appropriate space technologies
- iii. Acquire, adopt and adapt appropriate space technologies
- iv. Promote knowledge and technology transfer in space science and technology.

2.4.6.4 EAC Climate Change Master Plan (2011 – 2031)

The purpose of the Master Plan is to provide a long-term vision and a basis for Partner States to operationalize a comprehensive framework for adapting to and mitigating climate change in the EAC region in line with the EAC Protocol on Environment and Natural Resources Management and with international climate change agreements. The Vision is aligned and consistent with EAC's mandate, development priorities as articulated in a number of relevant environmental and climate change documents such as the EAC Climate Change Policy (EACCCP), EAC Climate Change Strategy, the EAC Protocol on Environment and Natural Resources and the EAC Food Security Policy. The Vision is consistent with Article 111.1(a) of the EAC Treaty, which obliges the Partner States to – take concerted measures to foster cooperation in the joint and efficient management and sustainable utilisation of natural resources within the Community. It is also in line with Article 7.1(a) of the EAC Protocol on Environment and Natural Resources Management, which calls on the Partner States to –co-operate in the development of a common policy on sound management of the environment, and natural resources.

The main regional issues which have been identified and prioritised by the EAC Partner States are:

1. Agriculture (crops, livestock and fisheries) and Food Security: to improve sustainable land use systems that enhance agricultural production and ensure food security under the changing climate;
2. Water Security: to protect and ensure sustainable management and resilience of transboundary water resources under the changing climate;
3. Energy Security: to scale up the exploitation and development of less carbon-intensive and more climate change-resilient energy infrastructure in the region;
4. Biodiversity and Ecosystems Services: to ensure the conservation of the integrity of biodiversity and ecosystem services that they provide;
5. Tourism is one of the main foreign exchange earners of the Partner States, there is therefore need to put in place measures to ensure sustainability of the sector;
6. Physical Infrastructure: to ensure that buildings, roads, railways, waterways and airways, etc., are climate proofed and adapt to climate change;
7. Human Health, Sanitation and Settlements are highly vulnerable to climate change and as such appropriated adaptation measures need to be put in place;
8. Trade and Industry are increasingly important in the region and are affected indirectly by climate change;
9. Education, Science and Technology are key planks to development of innovative ideas that will assist in combating climate change.

The master plan is cognizant of the focus areas that the EAC Regional Space Strategy should prioritize in terms of development and application.

2.4.6.5 EAC Industrialization Policy (2012-2032)

The overall objective of the East African Industrialisation Policy (2012-2032) is to enhance industrial production and productivity and to accelerate the structural transformation of economies of the EAC region in order to enable sustainable wealth creation, improved incomes, and a higher standard of living for the Community. The policy is themed, "to achieve a structural transformation of the manufacturing sector through high value addition and product diversification based on comparative and competitive advantages of the region".

The need to have an effective regional SST sector is to contribute to the growth of the strategic industries positioned in the policy. These include Agro-processing; Mineral beneficiation; Energy; and oil and gas processing. The value chains of the above key industries have a strategic component of SST.



2.4.6.6 EAC Food and Nutrition Security Action Plan (2018-2022)

The EAC Food and Nutrition Security Action Plan (2018-2022) is the second phase of the action plan to guide the implementation and actualization of the regional food security objectives. It proposes actions that cover all dimensions of food and nutrition security as was in the first phase. These include; food availability, access, utilization and stability. In addition, the emerging issues and trends that impact on food security in the region have also been taken into account. Some of the emerging issues of importance include; effects of climate change, urbanization, rapid population growth, increased focus on nutrition and diets, changing food systems that are putting emphasis on food safety, natural resource management, conflict and insecurity among others. During the implementation, there will be efforts to leverage some of the activities being spearheaded by other regional economic communities and development partners. The action plan in its final year of implementation can leverage on benefits of SST as a strategic tool for monitoring some aspects of climate and environment factors that contribute to food insecurity.

2.4.7 Benchmarking Review of Global and other Regional Based Space Programs Initiatives

2.4.7.1 The United Nations Office for Outer Space Affairs (UNOOSA)

The United Nations Office for Outer Space Affairs is the only United Nations entity dedicated exclusively to outer space affairs. The Office focuses specifically on the

⁹ <https://www.unoosa.org/oosa/en/aboutus/roles-responsibilities.html>

peaceful uses of outer space to advance international cooperation in space and the use of space science and technology for sustainable development, particularly for the benefit of developing countries. The Office serves as the secretariat to the Committee on the Peaceful Uses of Outer Space through which an annual multi-stakeholder dialogue on outer space is held with the aim of advancing these objectives.

The United Nations Office for Outer Space Affairs (UNOOSA) works to help all countries, especially developing countries, access and leverage the benefits of space to accelerate sustainable development. We work toward this goal through a variety of activities that cover all aspects related to space, from space law to space applications.

According to UNOOSA, SST has numerous that can be integrated into National, Regional and Continental Development agenda, the wide application can be observed in the following sectors: Agriculture; Global Health; Environment; Sustainable Development; Disasters; Education; Human Settlements; Research & Development; Transportation; Communication; Humanitarian Assistance; and International Peace & Security

UNOOSA does undertake various initiatives to promote its core objectives. These include:

- a. Capacity Building to countries so as to develop and make the most out of the space sector through a two-fold approach: on one side, we provide resources such as training, workshops, conferences and knowledge-sharing portals; on the other side, we complement these with concrete opportunities for countries to expand their space capabilities, such as fellowships and competitive programmes, some of which targeting specifically developing countries, for example under our Access to Space 4 All Initiative.
- b. Disaster risk reduction, our dedicated programme, UN-SPIDER, helps countries use space data and technologies, such as satellite imagery, to prevent and manage disasters.
- c. Support towards the understanding of fundamentals of international space law and increase their capacity to draft or revise national space law and policy in line with international normative frameworks on space. This is particularly important as more and more actors enter the space arena.
- d. Support upholding of transparency in space activities, through measures such as the Registry of Objects Launched in Outer Space, which we maintain, and which links each object to its responsible country.
- e. Promoting sustainable development and sustainability through space and related outer space activities, fostering international solutions to problems such as the rapid increase in space debris, to preserve space for future generations.
- f. Collaboration with other space agencies and space leaders around the world to devise solutions to challenges that require an international response, such as the threat of a Near-Earth Object impact and the need to accelerate the compatibility of GNSS systems.



2.4.7.2 SPACE 2030 Agenda10

The United Nations, involving more than 190 Member States, has developed the 2030 Agenda for Sustainable Development in order to address these challenges in the form of 17 Sustainable Development Goals (SDGs) with 169 associated specific targets.

The importance of the role of Earth Observation (EO) and geolocation (provided by GNSS) in supporting the achievement of the development goals is recognised by the UN (General Assembly Resolution A/RES/70/1: Transforming our world: the 2030 Agenda for Sustainable Development). However, the potential of space in supporting the SDGs is much wider. Space-based services and technologies are key in understanding climate change and during the full disaster management cycle; only two examples among countless applications to which space can contribute to.

2.4.7.3 Thematic priorities of UNISPACE +50

Since 1968, the United Nations has held three conferences on the exploration and peaceful uses of outer space: UNISPACE I, Vienna, 1968; UNISPACE II, Vienna, 1982; and UNISPACE III, Vienna, 1999.

UNISPACE+50 conference of 2018 marked the fiftieth anniversary of the first UNISPACE conference and take stock of the contributions to global space governance of the three UNISPACE conferences.

In order to guide preparatory work for UNISPACE+50, in June 2016 Committee on the Peaceful Uses of Outer Space (COPUOS) identified and agreed on seven thematic priorities, as well as their objectives and mechanisms that would provide guidance for global commitment on matters of peaceful uses of outer space. The thematic priorities are:

- a. Creating global partnership in space exploration and innovation;
- b. Establish and strengthen legal regimes of outer space and global space governance: current and future perspectives;
- c. Enhance information exchange on space objects and events;
- d. International framework for space weather services;
- e. Strengthened space cooperation for global health;
- f. International cooperation towards low-emission and resilient societies; and
- g. Promoting capacity-building for the twenty-first century

2.4.8 Asia Pacific Space Cooperation Organization (APSCO)

The Asia - Pacific Space Cooperation Organization (APSCO) headquartered in Beijing was inaugurated in 2008 as an inter-governmental organization. APSCO provides a cooperative mechanism for developing countries in the region to be able to mainstream peaceful use of space as a drive of development.

By resource sharing in space science, space technology and space application, APSCO promotes multilateral cooperation to facilitate capacity building of its members, including Bangladesh, China, Iran, Mongolia, Pakistan, Peru, Thailand and Turkey; Signatory State Indonesia, Observer State Mexico. APSCO's framework is guided by the Development Vision 2030.

The key initiatives that APSCO and its member states prioritize on include the following:

- a. Talent training is a very important Core of capacity building in developing countries. As the Basic Activity, APSCO Education and Training is catered for professionals and students from space agencies, institutes and universities
- b. To optimize cooperative activities among its Member States with their tremendous geographic distribution advantage. The core undertakings include:
 - i. Data Sharing Network: To meet the demand of wide range of satellite remote sensing data, APSCO initiated the Data Sharing Service Platform (DSSP) for free data sharing among its members in 2012. The resources are from China, and will also be provided by Iran, Pakistan, Peru, Thailand and Turkey. Meteorological satellite data can also available through this platform.
 - ii. Space Segment Network and Interconnection of Ground Systems: APSCO joint Small Multi-Mission Satellites (SMMS) Constellation consists of three in-orbit remote sensing satellites provided by China and Eight new satellites which are planned to jointly developed by all Member States. By connecting all ground stations in participating countries, the system efficiency and benefits will be extremely multiplied.
 - iii. Ground-Based Space Object Observation (APOSOS) Network: Enhanced observation duration and perspective is achieved through the network of ground-based space observation system for space object detection, tracking, and identifying capability building. Three telescopes have been installed in Iran, Pakistan and Peru, and a data center was established for data sharing and joint observation operating. In next phase, the system will be completed with observation nodes expansion.

- iv. **Disaster Monitoring Network:** Natural disasters frequently occur in Asia Pacific region. To enhance disaster management and rescue capability, APSCO jointly conducted studies on remote sensing data application for drought, flood and landslide, compatible GNSS for emergency use, earthquake prediction based on ground Ionospheric sounding and Electromagnetic Satellite. Furthermore, APSCO is developing a disaster management framework with Charter-similar Mechanism.
- v. **Space Application Network:** APSCO has initiated many other networks to sharing space infrastructure, such as tele-medicine, International GNSS Monitoring and Assessment Service. To strengthen space technology, different researches are also carried out, like Radiometric Calibration of Satellite Sensors, Ionosphere Modeling through Study of Radio Wave Propagation, Atmospheric Effects on Ka- Band Rain Attenuation.
- vi. **International Cooperation:** APSCO attaches great importance to its cooperative relationship with UN-OOSA and all space-faring nations and international organizations and establishes close cooperation with IAF, UN-ESCAP, ESA. APSCO is an Observer of ICG and GEO and participates in IAC and space activities towards realizing SPACE2030 Agenda and thematic priorities of UNISPACE +50. APSCO commemorates a decade of excellent space cooperation and strong support with its members and acknowledges an excellent cooperation with all partners, who contributed to APSCO's success

2.4.9 European Space Agency (ESA)

The European Space Agency (ESA) is Europe's gateway to space. Its mission is to shape the development of Europe's space capability and ensure that investment in space continues to deliver benefits to the citizens of Europe and the world.

ESA Agenda 2025 defines five immediate priorities as well as the vision for the next four years. The first priority is to strengthen ESA–EU relations. ESA will closely work with the European Commission to develop a joint ambition for space in Europe and to implement space programmes for European citizens. The European Commission provides important political leadership to space activities including initiating and funding flagships addressing societal needs such as Copernicus and Galileo, which work extremely well.

ESA's operations are pillared on Science & Exploration; Space Safety; Applications; and Enabling & Support. Additionally, the agency's mandate is delivered through the following programmes: Space Science; Human and Robotic Exploration; Observing the Earth; Telecommunications; Satellite Navigation; Space Transportation; and Technology Operations

2.4.10 European Union Agency for the Space Programme (EUSPA)

In 2021, in line with the new EU Space Regulation and the growing role of space in supporting EU priorities in terms of growth, competitiveness, sustainability, and security, the EU decided to expand the scope of the former European GNSS Agency

(GSA) to include new responsibilities. This resulted in the creation of the European Union Agency for the Space Programme (EUSPA), which was officially launched on 12 May 2021

The mission of the European Union Agency for the Space Programme (EUSPA) is defined by the EU Space Programme Regulation. EUSPA's mission is to be the user-oriented operational Agency of the EU Space Programme, contributing to sustainable growth, security and safety of the European Union.

Its goal is to: Provide long-term, state-of-the-art safe and secure Galileo and EGNOS positioning, navigation and timing services and cost-effective satellite communications services for GOVSATCOM, whilst ensuring service continuity and robustness; Communicate, promote, and develop the market for data, information and services offered by Galileo, EGNOS, Copernicus and GOVSATCOM; Provide space-based tools and services to enhance the safety of the Union and its Member States. In particular, to support PRS usage across the EU; Implement and monitor the security of the EU Space Programme and to assist in and be the reference for the use of the secured services, enhancing the security of the Union and its Member States; Contribute to fostering a competitive European industry for Galileo, EGNOS, and GOVSATCOM, reinforcing the autonomy, including technological autonomy, of the Union and its Member States; Contribute to maximizing the socio-economic benefits of the EU Space Programme by fostering the development of a competitive and innovative downstream industry for Galileo, EGNOS, and Copernicus, leveraging also Horizon Europe, other EU funding mechanisms and innovative procurement mechanisms; and Contribute to fostering the development of a wider European space ecosystem, with a particular focus on innovation, entrepreneurship and start-ups, and reinforcing know-how in Member States and Union regions.

2.4.11 Africa Union Space Science Initiatives

The African Union (AU) has not yet structured a space agency or joint space programme at the continent level. Initiatives and investments thus remain predominantly at the country level. However, in 2013, the African Union adopted the Africa Agenda 2063, where the Science, Technology and Innovation Strategy for Africa (STISA-2024) was defined to address development challenges. Acknowledging that space could play a critical role, an African Outer Space programme was defined,

followed by an African Space Policy, the African Space strategy, and finally, in 2018, an African Space Agency (AfSA), with its headquarters in Egypt. The primary role of AfSA is to "promote, advise and coordinate the implementation of programmes and activities approved by the African Space Council". However, the development of AfSA is challenged due to uncertainty about its role and competencies.

2.4.11.1 African Space Policy

The African Union formulated the Science, Technology and Innovation Strategy (STISA 2024), as an important intervention for using science, technology and innovation to respond to key priorities of the continent and realize Africa's aspirations.

On January 31, 2016, the African Union Heads of State and Government adopted the first African Space Policy and Strategy as one of the key mechanisms for implementing STISA 2024.

This policy identifies the key policy goals that will drive the agenda for any formal space initiatives on the continent. The policy goals are supported by a set of objectives and principles that articulate important aspects that need to be addressed in developing and maintaining a viable and sustainable space programme. These policy objectives and principles form the core building blocks and the basis for all decisions and action of the African space programme. This Policy is a guiding framework for the formalisation of an African space programme, and is complemented by the African Space Strategy and associated implementation plans, and governance structure. The policy drivers for an African space programme are expressed through high-level policy goals, which are: To create a well-coordinated and integrated African space programme that is responsive to the social, economic, political and environmental needs of the continent, as well as being globally competitive; and to develop a regulatory framework that supports an African space programme and ensures that Africa is a responsible and peaceful user of outer space.

The policy goals are anchored on the following objectives with specific set principles for ease of implementation:

- a. To harness the potential benefits of space science and technology in addressing Africa's socio-economic opportunities and challenges;
- b. To strengthen space mission technology on the continent in order to ensure optimal access to space-derived data, information services and products;
- c. To develop a sustainable and vibrant indigenous space industry that responds to the needs of the African continent;
- d. To adopt good corporate governance and best practices for the coordinated management of continental space activities;

- e. To maximize the benefit of, current and planned, space activities, and avoid or minimize the duplication of resources and efforts; and
- f. To promote the African-led space agenda through mutually beneficial partnerships.

2.4.11.2 African Space Strategy

This strategy has been developed to advance an indigenous space sector and provides direction for a formal African space programme. The African Space Strategy hinges on the African Space Policy, which provides the main tenets and guiding principles for the establishment of a formal African space programme. This strategy is an expression of the key intent and programmes of action that are needed to give effect to the identified goals and strategic objectives, so that maximum impact can be made in leveraging the benefits of space science and technology as a tool for informing

solutions to our political, economic, social and environmental challenges. Appropriate governance structures will be mandated to ensure that this strategy is implemented to ensure the effective development and coordination of an African space programme, which will draw on the capacities of member states and regional programmes.

African Space Strategy envisions an African space programme that is user-focused, competitive, efficient and innovative. The strategy is anchored on two major goals that seek to deliver to the continent: A space-derived products and services used for decision-making and addressing economic, political, social and environmental challenges; and an indigenous space capability, in both the private and the public sectors, for a coordinated, effective and innovative African-led space programme. The Strategy focuses on strengthening Africa's capabilities in the following thematic areas: Earth Observation- Gathering of the earth's physical, chemical and biological information to improve management of resources; Satellite Communication-Relaying, amplifying and broadcasting voice and video signals from a transmitter to a receiver at different locations on Earth; Navigation and Positioning-Applicable in many areas

such as the global air traffic management system; and Space Science and Astronomy- Study to understand the origin and evolution of the dynamic universe and its constituents The Strategic actions intended to give direct effect to the strategic objectives and

underlying principles identified in the African Space Policy include: Leveraging space- derived benefits; Strengthening research, development and innovation; Developing and using human capital; Institutionalising a corporate governance

structure; Adhering

to regulatory requirements; Building critical infrastructure; Fostering regional coordination and collaboration; Promoting strategic partnerships; and Funding and sustainability

2.4.11.3 African Space Agency (AfSA)

African Space Agency (AfSA) was established in accordance with Article 5(2) of the constitutive act as an Organ of the African Union, dedicated to promoting, advising and coordinating the development and utilization of Space Science and Technology in Africa and associated regulations for the benefit of Africa and the world and forging intra-African and international cooperation. The statute establishing AfSA was adopted by the thirtieth ordinary session of the assembly that was held in Addis Ababa, Ethiopia on 29th January 2018.

The main objectives of the African Space Agency are to promote and coordinate the implementation of the African Space Policy and Strategy and to conduct activities that exploit space technologies and applications for sustainable development and improvement of the welfare of African citizens. In particular, the Agency shall: Harness the potential benefits of space science, technology, innovation and applications in addressing Africa's socio-economic opportunities and challenges; Strengthen space missions on the continent in order to ensure optimal access to space-derived data, information, services and products; Develop a sustainable and vibrant indigenous 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; Engage with its users through the establishment of Communities of Practice for each of the identified user requirements; and Promote an African-led space agenda through mutually beneficial partnerships.

2.5 Economic Community of West African States (ECOWAS)

ECOWAS and National Space Research and Development Agency (NASRDA) of Nigeria signed an MoU in 2017, which resulted in the formulation of the ECOWAS Strategy on Space Sciences and Geomatics. The Third Meeting of ECOWAS Ministers in charge of Science and Technology in Cotonou adopted this Strategy in December 2018.¹⁶ ECOWAS considers Space Science to be a unique opportunity for regional cooperation, infrastructure and data sharing." Adding that it plays important role in risk

reduction and disaster management such as droughts, floods and in mitigating and adapting to climate change. In West Africa, as in most of the other African regions, space applications are more widely used in telecommunications, audiovisual communications, weather forecasting and air navigation sectors. However, their use can be further strengthened in agriculture and environmental management, which are very important economic sectors.

In 2020, the ECOWAS Commission initiated a study to identify the needs of users of satellite data in the region as a basis for the design and manufacture of the first ECOWAS Earth Observation Satellite (ECOSAT 1). This study is part of the ongoing process of building the ECOWAS Earth Observation Satellite. The Economic Community of West African States Commission (ECOWAS Commission) is one of the new Participating Organisations of the Group on Earth Observations (GEO).¹⁷

2.6 Southern African Development Community (SADC)

The region may not have made so much progress in the SST sector. That explains the lack of a standalone legal framework in the past. However, member states such as Angola and South Africa have taken lead in the contribution to the growth of SST in the region. However, both countries have standalone entities responsible for manning SST Agenda at the national levels. These include the National Space Program Office (GGPEN) for Angola and the South African National Space Agency (SANSA). Equally, The United Republic of Tanzania, equally has been at the forefront of the growth of SST at the continental arena despite not having a standalone entity mandated to oversee the SST programs.¹⁸ The application of satellite technology is an important element of the SADC region as highlighted in the ICT strategy. Having realized the over dependence on foreign satellite services by majority of the SADC Member States, the regions leadership in

2017, through SADC ICT ministers tasked Member States to establish a SADC Committee of Satellite Experts to develop the SADC Satellite Sharing Program.

The program was aimed at tapping into the vast opportunities presented by satellite technology in the area of communication, navigation, space infrastructure and application development, this policy aims to promote the development and expansion of the use of space technology and its applications for socioeconomic development in SADC.

The policy framework will seek to achieve the following: remove barriers to the use of satellite technology and resources, facilitating the recognition and management of satellite resources for the socio-economic development of the region; promote and expand mutually beneficial cooperation between space research and

development

agencies, space service and product providers and users in the SADC region; and explore possibilities for cooperation with entities related to space outside the region. This policy framework aims at the development of space infrastructure, the training and promotion of the space sector, the growth of space industry and technologies, the international affirmation of Angola in the space domain and the internal creation of organizational structures that ensure the pursuit of the intended objectives and also with the objectives of sustainable development in the region, which aims to significantly increase access to information and communication technologies and strive to offer universal and affordable access accessible to the internet in the least developed countries.¹⁹



CHAPTER THREE: VISION, MISSION, GOALS AND STRATEGIC OBJECTIVES

3.1 Vision

A well-coordinated and effective utilization of space science and technology for east Africa growth and development.

3.2 Mission

To create and promote and integrated EAC outer space program for an innovative and competitive STI sector for the wellbeing of our people.

3.3 Goals

The EAC Regional space science and technology programme will be aligned with the following primary goals, namely –

- i. To provide a guiding framework for development, promotion and coordination of the implementation of activities that exploit space science and technologies for regional integration, sustainable development and global competitiveness;
- ii. To create a well-coordinated and integrated EAC space science and technology and innovation programmes that are responsive to user needs;
- iii. To support the development of systems and applications to enhance the uptake and utilization of space derived data and information for decision making;



- iv. To develop and enhance the human capacity in space science and technology;
- v. To build requisite space science and technology infrastructure;
- vi. To conduct long term planning and implementation of space-related innovation programs to deliver cost-effective space-based products and services;
- vii. To promote research and development in space science and technology in public and private institutions as well as partnerships;
- viii. To promote the development of an appropriate and competitive domestic and regional commercial space sector in order to provide the industrial base to meet the region's needs for space technology;
- ix. To collect, archive, assimilate and disseminate space data to support policy, decision making and sustainable economic growth in the region.

3.4 Strategic Objectives

EAC seeks to enhance access to space services and grow the demand for space services through effective and efficient service delivery and industry coordination

3.4.1 Strategic Objective 1: Delivery of Space applications, products and Services

EASTECO has identified six (6) space science and technology strategic programs of service to be implemented by this strategy. Space operations and systems engineering, earth observation application and services, navigation and positioning, satellite communications and broadcasting, space operations an systems engineering and space science and astronomy Strategic actions:

- Space Operations and Systems Engineering: Partner states to support the development of space operations and systems engineering programme services related to the development, launch and operations of spacecrafts in space. EAC partner states to implement the programs of satellite manufacturing, mission and operations control, telemetry, tracking and command services as well as launch services.
- Earth Observation applications and services: Partner States will support the development of Earth Observation (EO) programme for monitoring Earth from Space using remote sensing techniques. The Partner States to establish an EAC Regional earth observation data centre, develop a platform to integrate satellite and in-situ data, and develop the EAC Resource and Environmental Management Constellation in partnership with other RECs. This will help Partner States to monitor the environment, natural resources, and disasters, ocean circulations, climate change, desertification, deforestation, and understand the changes happening in their respective countries. Such monitoring capabilities are critical for the long-term sustainable use of the continent's scarce resources. Satellites make it possible to monitor

- Space science and Astronomy programme: Partner States to support the development of Space science and Astronomy programme that deals with scientific disciplines in Space exploration and study of natural phenomena and physical bodies occurring in outer space. This will help Partner States observe outer space, provide services on space weather and astronomy.

3.4.2 Strategic Objective 2: Human capital development and Public Awareness

EAC Partner States will develop regional and national capabilities for promoting space sector growth for sustainable regional development. The appropriate expertise and skills necessary for a space programme will be an area that should receive priority attention.

Strategic actions:

- Assessment of space potential of EAC Partner States
- Invest in human capacity through developing significant numbers of space professionals skilled in the many space science, engineering, and operational disciplines vital to establishing and maintaining national space capabilities,
- Implement strategic interventions for capacity-building that use Information Communication and Technology (ICT) for training, harnessing networking opportunities, and building strategic partnerships,
- Acquire critical infrastructure/facilities for human capital development,
- Establish and support space center of excellence in the EAC region that will coordinate human capital, research and innovation development;
- Promote research and undertaking education and public awareness.
- Promote the uptake of space science, technology and applications. This will require that the Partner States develop capacity-building frameworks to:
 - i. Develop human resource competencies;
 - ii. Acquire critical assets and infrastructure;
 - iii. Promote growth in research, innovations and applications in space science and technology; and
- Promote public awareness of the Space sector activities and potential including the relevance, benefits and opportunities. In order for East Africa's space program to be meaningful to the general public, public awareness of the benefits of space technology and its manifold application products and services will have to be created. No technology platform is embraced without a wide understanding of the platform, and awareness and advocacy programs will therefore be vital to the development of East Africa's space programme.



environmental change caused by human activity and natural processes.

- **Satellite communication and broadcasting:** Satellites enable long-distance communications, television broadcasting, distance learning and health education, data networks, maritime communications and disaster relief networks. Satellite applications provide farmers valuable climatic data and agricultural planners with information, this technology has improved food production and crop management. Weather satellites are integrated into the Global Telecommunications System, as an essential element of global, regional and national meteorological coverage. The establishment of satellite systems provides a cost-effective and efficient solution for communication services. Partner states to support the development of Satellite communications program for the transmission of signals using the electromagnetic spectrum between ground receivers and transponders on telecommunication satellites, develop technologies for low data rate payloads, develop technologies for applications in e-education, telemedicine and rural communication and disaster support, develop a geostationary (GEO) communications system, and launch a small GEO satellite. This will help Partner States to provide communication services

in case of disasters, connect remote locations, support telemedicine and tele-education. Telecommunication satellites offer telecommunication services that provide telephony and data transmission for remote areas using small dishes and advanced very small aperture terminal (VSAT) techniques, thus providing for specific services to a target group.

- **Navigation and positioning systems:** Partner states to support the development of Navigation and Positioning programme for determination of the route to a desired geographic location, develop a navigation augmentation system, and Develop navigation applications to support user requirements. This will help Partner States to tap into possibilities of precision agriculture, route mapping, addressing systems and other related geolocation services. Navigation and Positioning systems are intended to improve traveler safety, improve travel efficiency by reducing congestion, save energy through the reduction of fuel requirements, and lessen the environmental impact of travel. Automobile navigation applications also help drivers make the most efficient routing decisions. This technology is also useful for fleet vehicle management and the tracking of valuable assets, especially across national borders. GPS has also recently been applied to the surveillance of illegal shipping activities, and the monitoring of oil spills and the ensuing environmental damage.

3.4.3 Strategic Objective 3: Space Innovation and Research Development

The development of regional capacity and capabilities will enable research, development and innovation in the East African space sector. Given that space science and technology is still a fledgling sector on the continent, research, development and innovation should play a key part in industrial development. Hence,

knowledge production (research and development) and the exploitation of this knowledge (innovation) will be central in ensuring a financial and/or social return. Knowledge production and transfer should, therefore, be a strategic focus for the diffusion of innovation. Research, development and innovation initiatives should provide opportunities for the scientific and engineering space workforce to internalize the current intellectual capital and excel in the development of next-generation technology platforms, products, and services.

Strategic action:

- Support the development of local scientific research capacity in this area, making use of existing infrastructure, to build up the relevant expertise within the Region;
- Support EAC Partner States to be providers of critical space technology to the international space community, making East Africa amongst, if not, the leaders in the space arena;
- Promote scientific and industrial space research for new technology developments and knowledge creation, as well as new and improved space capabilities for sustainable development;
- Support space research institutes and tertiary-level institutions to ensure exposure of students to space science and technology, thereby contributing to the capacity-building goal;
- Strengthen partnerships among industry, the Space Agency, the Ministries responsible for Space, and the National Councils/Commissions of Science, Technology and Innovation.
- Support the development of Regional Geospatial Information Management system

3.4.4 Strategic Objective 4: Space Infrastructure and Industrial Development

Appropriate infrastructure is the cornerstone of an effective space programme, enabling technology transfer and human capacity development initiatives. Therefore,

it is imperative to develop and foster appropriate infrastructure in East Africa region.



The goal is to establish an industrial base that will provide the required space manufacturing capabilities to East African Partner States. The development of space systems requires sophisticated technical and industrial capabilities, which will have to be developed locally or acquired through strategic partnerships. One such area pertains to improving industrial processes and quality standards to meet global space system requirements. A key capability to be built up is in the area of spacecraft-building skills. In respect of operational space systems, the region will have to acquire capabilities relating to spacecraft lifecycle management and space situational awareness. Moreover, the development of space application products and services will require the creation of additional capabilities in the industry. The higher education sector can play a role in creating professional training opportunities with international partners to address these capability gaps. The EAC Industrial Policy Framework promotes long-term intensification of the industrialization process with a movement towards a knowledge-based economy. The space sector is regarded as one of the knowledge-based sectors which require increased R&D in areas in which the region has a potential advantage, as well as improved innovation using domestic and regional technologies. It sees skills and education for industrialization, traditional and modern infrastructure, and innovation and technology as the necessary conditions for successful industrialization, as well as for the space industry to thrive and compete internationally and within East African region markets.

Strategic actions:

- Support the establishment of a regional industrial infrastructure base that will provide the required spacecraft manufacturing capabilities and ground segment operations of space systems to East African Partner States;
- Support the establishment of a regional facility for satellite assembly, testing, and integration, as well as facilities to support flight testing and space launch activities.
- Support the development of technical and industrial capabilities for spacecraft manufacturing skills, spacecraft lifecycle management, and space situational awareness.
- Establish partnerships with international space agencies for creating professional training opportunities to address capability gaps;
- Support the enhancement of space industrial development through strengthening manufacturing capabilities, and providing support for industry and related services, thus leading to industrial growth.
- Promote the competitiveness of the space industry that will contribute to employment creation and competitiveness in many sectors of the economy.

This will be achieved by creating a predictable and rational environment for innovation and industrial competitiveness.

- Support the development of the satellite imagery data observatory portal to address the needs of satellite data users, giving them a better picture of their land resources and land change.

The infrastructure required for space activities is costly and highly specialized. It should therefore be utilized in an optimal manner by both public and private sector users. These facilities also require a steady level of usage in order to maintain adequate levels of expertise, safety and quality.

3.4.5 Strategic Objective 5: Sustainable Funding and Resource Mobilization

For sustainability of space programmes, it is crucial that adequate funding is committed to ensure the optimal development and long-term sustainability of space programmes for EAC Region. Space Science and technology is costly and it is, therefore, essential to exploit existing space resources and to build on and optimise such resources. Monitoring and evaluation will be vital to ensure relevance and the long-term sustainability of space activities in Africa. EASTECO has developed a resource mobilization strategy that will be used to mobilize resources for the implementation of Space programmes and established the EAC Regional Research and Technological Development Fund that will provide resources for the Space program activities.

Strategic actions:

- Mobilize resources from African governments, the private sector and philanthropists for the implementation of the Space programme using the EASTECO resource mobilization strategy;
- Develop a financial mechanism/instrument to generate the funds needed for the East African space programme;
- Establish a Space Industry Development Fund under the and EAC Regional Research and Technological Development Fund;
- Support the Identification of strategic partners for resource mobilization and various sources of financial support
- Support the Identification of sources of non-financial support including machinery, equipment and infrastructure provided in-kind, and technical support or expertise.

For sustainability the Partner States will focus on resource efficiency, risk management, regular monitoring and evaluation, generating internal revenue, strategic management of partnerships, and management of assets.



3.4.6 Strategic Objective 6: Strengthening Coordination, Collaboration and Partnerships

Strategic partnerships with foreign partners are necessary for tangible and intangible technology transfer and a viable and sustainable space programme. The EAC to establish sector coordination and leadership mechanism that will enhance synergy among stakeholders and enhance service delivery. The Partner States have various activities that require the support of Space technology enabled services. Proper coordination and leadership will ensure that space stakeholders are well guided for effective investments, impact, and value for money. International co-operation offers good opportunities for building East Africa's strength in space technologies and applications through strategic partnerships with developed countries and other emerging space nations.

Strategic actions:

- Establish regional sector coordination and leadership mechanisms that will enhance synergy among stakeholders and enhance service delivery;
- Support Partner states to develop National Space policies and strategies as enabling environment for promoting space science and technology;
- Develop a communication and knowledge management framework for effective and efficient coordination of the sector initiatives and activities;
- Explore mutually beneficial and appropriate international co-operation opportunities in space science and technology consistent with regional strategic policy objectives of EAC Science, Technology and Innovation Policy, African Agenda 2063, EAC Vision 2050 and international obligations;
- Support Partner States' communication efforts to build greater awareness of East Africa's space policies and programmes, and encourage greater cooperation and utilization of East African space capabilities by interested African nations, as appropriate;
- Actively engage with other interested African nations to pursue common interests through cooperative means and strengthen East Africa's participation in global space fora;
- Strengthen international cooperation through bilateral co-operation agreements in multilateral space-related activities that include space science and exploration, Earth observation, communications and positioning, timing and navigation;
- Support the effective participation of EAC Partner States in regional and global multilateral forums to secure East Africa's access to space, including the assignment and use of orbital slots and the frequency spectrum, for both space infrastructure and ground-based infrastructure;

- Strengthen regional collaboration through sharing of experiences and knowledge to strengthen the space base in the EAC region in the form of bilateral and polyilateral engagements; and
- Support joint technology development, knowledge sharing, technology transfer, and the management of the intellectual property of space products should be promoted and strengthened.
- Support the establishment of the East African Regional Geospatial Information Management Network (EAC-GIN) to strengthen the coherence and coordination of Regional Geospatial Information Management across the EAC Region;
- Support the development of the East African Regional Geospatial Information Management Network (EAC-GIN) framework.



CHAPTER FOUR: IMPLEMENTATION PLAN

This strategy will be implemented within a period of five years (2023-2028). During this period, eleven objectives will be pursued through 6 strategies and 43 actions. Some of these activities will be implemented by EASTECO while most of the activities will be

implemented by the Partner States and their agencies with EASTECO providing a facilitating role. The implementation of these activities will lead to a series of outputs and outcomes as shown in the detailed Strategy Implementation Plan in Table 4.

4.1 Implementation structure

The implementation of the EA Regional Space Strategy will be undertaken by EASTECO, Partner States and their Agencies, as well as the private sector. A four-level implementation structure is proposed, which consists of EASTECO Governing Board, Regional Innovation and Technology Working Group, National Space Coordination Team (NSCT), and Implementing Agencies

4.2 EASTECO Governing Board

EASTECO has the responsibility for providing oversight on the implementation of various policies and strategies. Therefore, for the East Africa Regional Space Science and Technology Strategy, the mandate of the Governing Board will oversee the implementation of this strategy and mobilize the required resources and support for its implementation. The Governing Board will be expected to receive regular reports, as well as approve annual work plans and budgets related to the implementation of this strategy.

4.3 Regional Innovation and Technology Working Group

The strategy will be implemented by Innovation and Technology working Group in collaboration with the East African Regional Geospatial Information Management Network (EAC-GIN). The working group, which will be constituted by EASTECO Secretariat, will consist of representatives of the national Space agencies, agencies responsible for Science, Technology and Innovations, National Councils of Science and Technology, research organizations, universities, private sector as well as Space business associations. The working group will meet quarterly to receive and consolidate national annual work plans and budgets and prepare quarterly reports for presentation to the EASTECO Governing Board.

4.4 National Space Coordination Team (NSCT)

This will consist of all the agencies responsible for the implementation of the Space Strategy at the national level. This committee, which will be chaired by the EASTECO focal point at national level (mainly the National Space Agency) will be responsible for receiving and preparing a national implementation plans and budgets, at national level.

There will also be responsible for mobilizing resources at national level for the implementation of the strategy as well as publicity and monitoring and evaluation of the progress of implementation. The NSCT will also be responsible for preparing quarterly reports for submission to the Regional Innovation and Technology Working Group

4.5 Implementing Agencies

The actual implementation of the various activities of the strategy will take place at the National Space Agency level. The National Space Agencies will only implement those activities that they deem relevant to their mandates, and which are prioritized by their organizations. These activities are expected to be included in their annual work plans



and where possible, funded through the national budgets. The heads of the National Space Agencies or their nominees, will coordinate the implementation of the activities and reporting, on a quarterly basis, of the implementation progress to the National Space Coordination Team.

4.6 Communication and Publicity

Communication will be key in the implementation of the EA Regional Space Strategy. This strategy should be widely disseminated at regional, national and institution levels.

Upon adoption of the Strategy, the Regional Innovation and Technology Working Group will prepare a communication plan for the strategy, which will guide communication activities throughout the life of the strategy. Communication will be coordinated at the Secretariat level.

4.7 Financing of the Strategy

The possible funding of the implementation of the strategy will be as follows: EASTECO annual budget, Budgetary allocations of the individual implementing agencies and institutions, Resources mobilized from development partners at institutional, national and regional levels, and East African Research and Technological Development Fund.

Upon adoption of the Strategy, the Regional Innovation and Technology Working Group will use EASTECO resource mobilization Strategy, which will guide mobilization of resources particularly for those activities at the regional levels. Implementing institutions will be expected to also mobilize resources through their existing and potential funders.

Table 4 Implementation Plan

STRATEGIC OBJECTIVES	Actions	OUTPUTS	TIME FRAME (YEAR)					RESPONSIBILITY	BUDGET US\$
			1	2	3	4	5		
Strategic Objective 1: Delivery of Space applications, products and Services	Support the develop Space Operations and Systems Engineering programme services	Space Operations and Systems Engineering programme services developed						EASTECO and Partner States	500,000
	Support the develop Earth Observation (EO) programme for monitoring Earth from Space using remote sensing techniques.	Earth Observation (EO) programme for monitoring Earth from Space using remote sensing techniques developed.						EASTECO and Partner States	500,000
	Support the establishment of satellite systems for communication services, and development of Satellite communications program for the transmission of signals	Satellite systems for communication services developed						EASTECO and Partner States	500,000
	Support the development of Navigation and Positioning programme	Navigation and Positioning programme developed						EASTECO and Partner States	450,000
	Support the development of Space science and Astronomy programme	Space science and Astronomy programme developed						EASTECO and Partner States	350,000



Strategic Objective 2: Human capital development and Public Awareness	Assessment of space potential of EAC Partner States	Space potential of EAC Partner States developed				EASTECO and Partner States	130,000
	Carryout human capacity skilled in space science, engineering and operational disciplines	Human capacity skilled in space science, engineering and operational disciplines carried out				EASTECO and Partner States	120,000
	Acquire critical infrastructure/facilities for human capital development	Critical infrastructure/facilities for human capital development acquired				EASTECO and Partner States	150,000
	Establish and support space centre of excellence in the EAC region	Space centre of excellence in the EAC region established				EASTECO and Partner States	155,000
	Support research in Space science and technology	Research in Space science and technology supported				EASTECO and Partner States	250,000
	Support the uptake of space science, technology and applications	Uptake of space science, technology and applications supported				EASTECO and Partner States	125,000
	undertake education and public awareness	Education and public awareness undertaken				EASTECO and Partner States	130,000

Strategic Objective 3: Space Innovation and Research and Development	Support the development of local scientific research capacity in this space science and technology	Local scientific research capacity in this space science and technology developed					EASTECO and Partner States	135,000
	Support EAC Partner States to be providers of critical space technology to the East African space community	Partner States to be providers of critical space technology to the East African space community supported					EASTECO and Partner States	140,000
	Promote scientific and industrial space research for new technology developments and knowledge creation	Scientific and industrial space research for new technology developments and knowledge creation promoted					EASTECO and Partner States	150,000
	Support space research institutes and tertiary-level institutions to ensure exposure of students to space science and technology	Space research institutes and tertiary-level institutions supported to ensure exposure of students to space science and technology s					EASTECO and Partner States	150,000



	<p>Create partnerships among industry, the Space Agency, the Ministries responsible for Space, and the National Councils/Commissions of Science, Technology and Innovation</p>	<p>Partnerships among industry, the Space Agency, the Ministries responsible for Space, and the National Councils/Commissions of Science, Technology and Innovation created</p>	<p>EASTECO and Partner States</p>	<p>125,000</p>
	<p>Support the development of Regional Geospatial Information Management system</p>	<p>Regional Geospatial Information Management system developed</p>	<p>EASTECO and Partner States</p>	<p>125,000</p>
<p>Strategic Objective 4: Space Infrastructure and Industrial Development</p>	<p>Establish regional industrial infrastructure base for spacecraft manufacturing capabilities and ground segment operations of space systems</p>	<p>Regional industrial infrastructure base for spacecraft manufacturing capabilities and ground segment operations of space systems established</p>	<p>EASTECO and Partner States</p>	<p>250,000</p>
	<p>Establishment of a regional facility for satellite assembly, testing, and integration, as well as facilities to support flight testing and space launch activities.</p>	<p>Regional facility for satellite assembly, testing, and integration, as well as facilities to support flight testing and space launch activities established</p>	<p>EASTECO and Partner States</p>	<p>450,000</p>

<p>Build technical and industrial capabilities for spacecraft manufacturing skills, spacecraft lifecycle management, and space situational awareness.</p>	<p>Technical and industrial capabilities for spacecraft manufacturing skills, spacecraft lifecycle management, and space situational awareness built</p>	<p>140,000</p>
<p>Establish partnerships with international space agencies for creating professional training opportunities to address capability gaps;</p>	<p>Partnerships with international space agencies for creating professional training opportunities to address capability gaps established</p>	<p>120,000</p>
<p>Promote the competitiveness of the space industry that will contribute to employment creation and competitiveness in many sectors of the economy.</p>	<p>Competitiveness of the space industry that will contribute to employment creation and competitiveness in many sectors of the economy promoted</p>	<p>120,000</p>



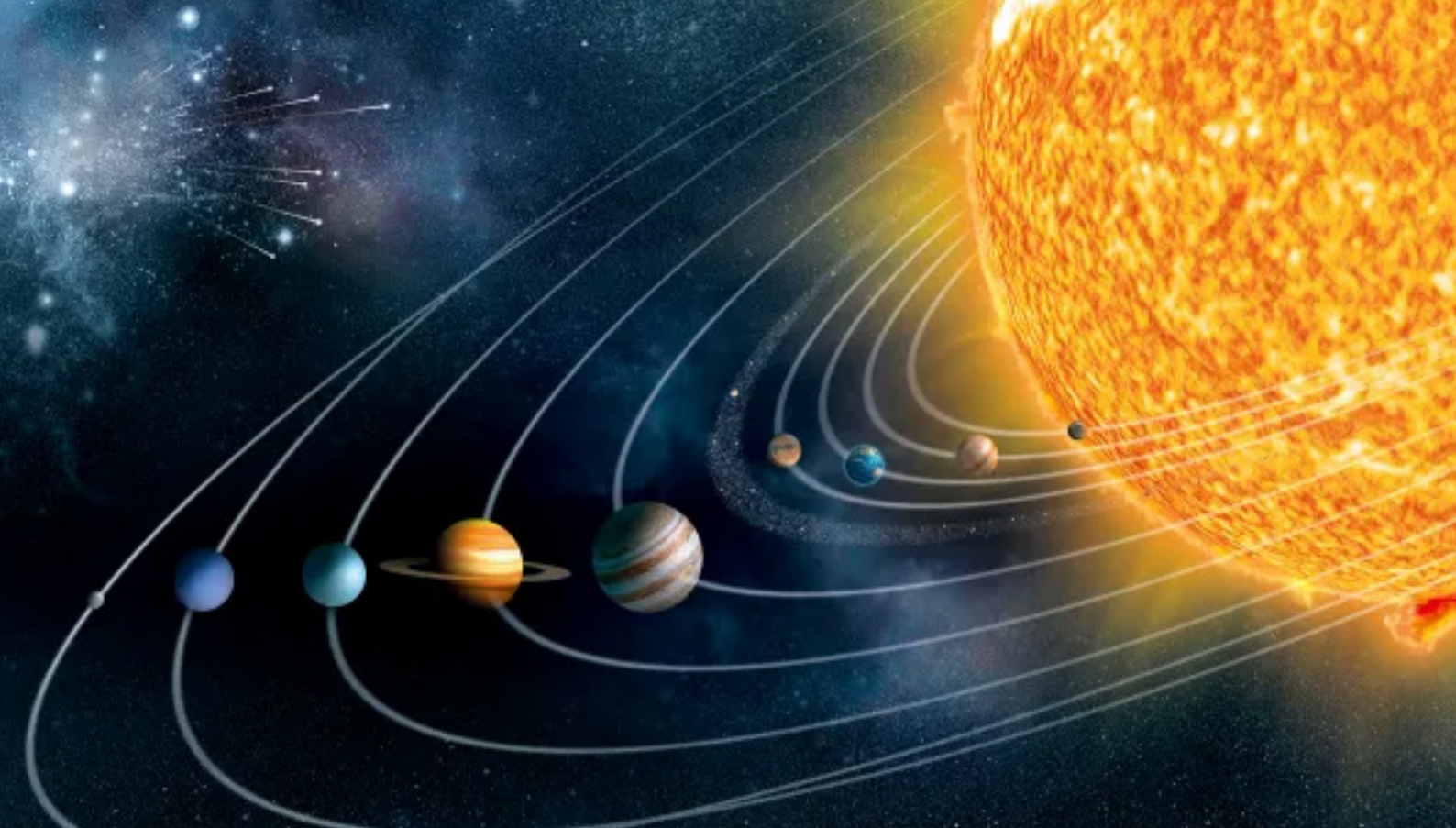
<p>Strategic Objective 5: Sustainable Funding and Resource Mobilization</p>	<p>Develop a satellite imagery data observatory portal to address the needs of satellite data users</p>	<p>Satellite imagery data observatory portal to address the needs of satellite data users developed</p>	<p>EASTECO and Partner States</p>	<p>140,000</p>
	<p>Mobilize resources for the implementation of the Space programme using the EASTECO resource mobilization strategy</p>	<p>Resources for the implementation of the Space programme mobilized</p>	<p>EASTECO and Partner States</p>	<p>145,000</p>
	<p>Establish a Space Industry Development Fund under the and EAC Regional Research and Technological Development Fund</p>	<p>Space Industry Development Fund under the and EAC Regional Research and Technological Development Fund established</p>	<p>EASTECO and Partner States</p>	<p>250,000</p>
	<p>Identify strategic partners for resource mobilization and various sources of financial support</p>	<p>Strategic partners for resource mobilization and various sources of financial support identified</p>	<p>EASTECO and Partner States</p>	<p>125,000</p>

	<p>Identify sources of non financial support including machinery, equipment and infrastructure provided in kind, and technical support or expertise</p>	<p>Sources of non financial support including machinery, equipment and infrastructure provided in-kind, and technical support or expertise identified</p>	<p>EASTECO and Partner States</p>	<p>120,000</p>
<p>Strategic Objective 6: Strengthening Coordination, Collaboration and Partnerships</p>	<p>Establish regional sector coordination, cooperation and leadership mechanisms that will enhance synergy among stakeholders and enhance service delivery</p>	<p>Regional sector coordination, cooperation and leadership mechanisms established to enhance synergy among stakeholders and enhance service delivery</p>	<p>EASTECO and Partner States</p>	<p>120,000</p>
	<p>Develop National Space policies and strategies as enabling environment for promoting space science and technology</p>	<p>National Space policies and strategies developed as enabling environment for promoting space science and technology developed</p>	<p>EASTECO and Partner States</p>	<p>170,000</p>



	<p>Develop a communication and knowledge management framework for effective and efficient coordination of the sector initiatives and activities</p>	<p>Communication and knowledge management framework for effective and efficient coordination of the sector initiatives and activities developed</p>		<p>EASTECO and Partner States</p>	<p>120,000</p>
<p>Create awareness of East Africa's space policies and programmes</p>	<p>Awareness of East Africa's space policies and programmes created</p>		<p>EASTECO and Partner States</p>	<p>125,000</p>	
<p>Engage with other African nations to pursue common interests through cooperative means and strengthen East Africa's participation in global space fora</p>	<p>Participation of EAC Partner states in global space for a strengthened</p>		<p>EASTECO and Partner States</p>	<p>170,000</p>	

<p>Sign bilateral co-operation agreements in multilateral space science and exploration, Earth observation, communications and positioning, timing and navigation</p>	<p>Bilateral co-operation agreements in multilateral space science and exploration, Earth observation, communications and positioning, timing and navigation signed</p>	<p>EASTECO and Partner States</p>	<p>125,000</p>
<p>Participation of EAC Partner States in regional and global multilateral forums to secure East Africa's access to space</p>	<p>Participation of EAC Partner States in regional and global multilateral forums to secure East Africa's access to space ensured.</p>	<p>EASTECO and Partner States</p>	<p>120,000</p>
<p>Share experiences and knowledge to strengthen the space base in the EAC region in the form of bilateral engagements</p>	<p>Experiences and knowledge to strengthen the space base in the EAC region in the form of bilateral engagements shared</p>	<p>EASTECO and Partner States</p>	<p>125,000</p>



CHAPTER FIVE: MONITORING AND EVALUATION PLAN

The Monitoring and Evaluation plan will guide the monitoring of the implementation of this strategy. The plan serves as a tool to guide in the overall execution of the East African Regional Space Science and Technology Strategy. It is expected that the strategy implementation team will update it as necessary to reflect changes in the strategy and ongoing tasks. Updates will also incorporate feedback from stakeholders as well other implementing partners.

5.1 Tools for Monitoring

The following tools should be prepared for monitoring the strategy implementation:

- a. Annual work plan: A comprehensive annual work plan should be prepared which will guide the continuous monitoring of the implementation of the strategy. Review of monthly performance will inform the preparation of quarterly reports.
- b. Quarterly reports and meetings: The implementation team should have quarterly progress meetings which are followed by the preparation of quarterly progress reports.
- c. Annual reports and meetings: The implementation team will prepare an annual report consisting of consolidated quarterly progress reports.



5.2 Evaluations

There are two evaluations proposed during the implementation of this strategy:

- a. Mid-term evaluation: This will be done immediately after the 30th month. The focus of the mid-term's evaluation will be to document progress of implementation of the strategy work plan and the intervention measures undertaken and will equally inform mid-term review of the work plan. This will be done through support of external evaluators.
- b. Terminal evaluation: This should be done by an external consultant at the end of the strategy period. It will focus on the extent of the realization of the strategic objectives/ outcomes, efficiency and effectiveness, relevance, sustainability, impact, and lessons learned from the implementation of the strategic plan.





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