



SPATIAL STRATEGY OF THE REPUBLIC OF ANGOLA

2016-2025

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EXECUTIVE SUMMARY

The Spatial Strategy of the Republic of Angola 2016-2025 establishes the goals and general guidelines that should govern space activity in Angola taking into account the recognition of the vital importance that the use of space has for socio-economic development and positioning of the Republic of Angola.

The Space Strategy is based on five fundamental pillars or strategic axes:

- **Axis 1: Space infrastructure development** - which aims to ensure that Angola has a stable network of satellite resources and services in several domains that safeguards its technological independence and satellite data;
- **Axis 2: Capacity building and promotion of the space sector** – whereby the main purpose is to streamline the development and use of space products, services and applications, ensuring that the capacity building, and dissemination of activities in this field contributes to the creation of specialized human capital and thus, for the country's development;
- **Axis 3: Industrial Growth and space technologies** - to ensure the initiative of private sector, aiming to diversify investments in space and contribute to the development of this sector;
- **Axis 4: International affirmation of the Angolan State in the space domain** - which main goal is to ensure that the Republic of Angola assumes a relevant role in the international context space policy, with a view of ensuring that the country contributes to the definition of main international guidelines in this field and participates in initiatives and relevant projects;
and
- **Axis 5: Internal set up of organizational structures that ensure the continuation of intended goals** - which aims to ensure that the implementation of Space Strategy Community Measures is carried out in a central and coordinated manner by creating an organic ecosystem that leads, promotes and monitors strategic lines of action.

Each of these axes integrates short, medium and long-term strategies and lines of action, with a view to ensure that in 2025 each of them is carried out and/or in implementation. In addition, that the activity of the

Republic of Angola will continue in a sustainable and effective manner under the strategies and space programs that follow this document after 2025.

The Executive already highlights priority structural projects that must constitute to the content of the first National Space Program:

1. Space infrastructure project with the launch of the ANGOSAT 1 satellite, expansion and development of the terrestrial telecommunications segment with direct impact on television terrestrial digital;
2. Human resources training project, namely through the building, implantation and development of the National Centre for Space Studies, with direct impact on promoting technology transfer and industrial incubation; and
3. Implementation of an Angolan spatial institutional structure, namely the creation and implementation of the Angolan space agency.

The Executive believes strongly that it is necessary to guarantee the self-support of the National Space Strategy and each of its Programs. Consequently, the revenues obtained from space activities and technologies, namely the availability of surplus capacity from ANGOSAT (and future communications satellites) to the private sector and neighbouring countries, as well as the marketing of satellite images. Moreover, in the medium and long term, the exploration of orbital positions must constitute privileged sources of financing for the National Space Strategy and Programs.

The implementation of this Space Strategy will contribute in a way that Angola will continue in the path of autonomy, technical independence, economic and international prestige. Will allow, additionally, transforming the Republic of Angola from a user/consumer of services, products and space technology, for an operator and producer of space services, products and technology.

This repositioning of Angola will have profound repercussions on the national and international policy of the State, while strengthening the role of leadership, innovation and pioneering of the Republic of Angola.

I. INTRODUCTION

I. INTRODUCTION

The Spatial Strategy of the Republic of Angola 2016-2025 establishes the goals and general guidelines that should govern space activity in Angola taking into account the recognition of the vital importance that the use of space has for the socio-economic development and the strategic positioning of the Republic of Angola.

I.1. THE OPPORTUNITY AND NEED FOR SPATIAL STRATEGY

The Space Strategy of the Republic of Angola defines the main principles that the Angolan government should adopt to promote the use of ultra-terrestrial space with a view to guarantee the country's socio-economic development and affirm the Angolan State in the international and regional context.

Three main reasons justify the present Space Strategy:

- (1) The launching of the ANGOSAT communications satellite, scheduled for 2017;
- (2) The indispensable role of space utilization in virtually all areas and relevant sectors of Angola;
and
- (3) The positioning of several countries, including emerging ones, in the space sector, together with African countries and the African Union.

I.1.1. THE ANGOSAT

ANGOSAT is the embryo and the first step of the national Space Strategy, having been approved by Resolution No. 65/08, of 15 July. This diploma establishes that it is necessary for satellite telecommunications infrastructure taking into account the characteristics of the national territory (in particular its size and population density) and the need to harmonize economic growth. Furthermore, that the dimension of the ANGOSAT project makes “*the creation of its own national capacity in resources and space segment*”, So the project integrates not only production, the launching and operation of the satellite, but also the creation of national capacity in human resources and infrastructure.

Presidential Order No. 5/11, of 25 January, approves, in turn, the hiring of the financing related to construction and orbit contracts from ANGOSAT.

The National Development Plan 2013-2017 also indicates as a goal the promotion of the ANGOSAT project.

The ICT White Paper, approved by Presidential Order No. 71/11, of 12 September, indicates, in turn, that the Executive recognizes that, with the “(...) *implementation of multisectoral support satellite telecommunications project and the ANGOSAT project, Angola should leverage the acquisition of knowledge that will enable her to develop an industry and national know-how through progressive long-term evolution of national incorporation indexes in the field of space technology*”.

Other plans and strategies in the area of communications also mention ANGOSAT, such as:

- The National Information Society Plan 2013-2017 mentions the launching of the ANGOSAT as an infrastructure project relevant to the promotion of information in the Angolan society;
- The National Plan for Access to ICT in Rural Areas 2015 - 2017 mentions the ANGOSAT as a very relevant project for the development of the satellite communications in rural areas;
- The Strategic Plan for the Radio electric Spectrum and Numbering (PERNUUM) mentions the ANGOSAT as deserving a prominent place in the strategic analysis of the radioelectric spectrum.

ANGOSAT		
Project Approval Resolution No. 65/08, of July 15	Project Financing Presidential Order No. 5/11, of 25 January	
National Development Plan 2013-2017		
ICT White Papper		
National Plan for the Information Society	National Plan for Access to ICT in Rural Areas	Strategic Plan for the Radioelectric spectrum and Numbering

Table 1 ANGOSAT relevant diplomas

Investment in space, having started with the ANGOSAT project. It is also preliminarily framed in the ICT White Paper when referring to the National Space Program (PEN).

According to the White Paper, PEN is expected to achieve the following primary goals:

- The induction of the development of the National Industry;

- The development of the scientific competences of national human resources;
- The development of national technological skills in the space sector;
- The development of international cooperation in the field of the peaceful use of space resources.

It is further indicated that the development of the PEN will have a multidisciplinary impact in the following areas:

- **Strategic**, in terms of technological support for capillarity, control, dispersion and training of defence and security services;
- **Social**, in terms of technological support for training, availability, connectivity, mobility and remote accessibility of services to citizens and the geographical cohesion of Angolan citizenship;
- **Scientific**, to provide good scientific support programs required of universities, research centres and industry;
- **Industrial**, through the stimulus of the economy resulting from the productive demand as well as from the fulfilment of the evolutionary national incorporation policies, that is, the induced creation of the national industry to support the implementation of the PEN.

The White Paper further clarifies that *“PEN should integrate Motor Projects that will generate Development Vectors, that is, projects that allow planning for wealth creation or knowledge for the country. Each development vector must be perfectly structured and planned, both in size and content, in the necessary investments, as well as in the relevant agreements with industry or national and international organizations, with special attention to training.”*

It is also states that the *“(…) Executive also recognizes that training and knowledge acquisition is one of the fundamental and priority goals of the National Space Plan, so that Angola gains independence in the aerospace sector in which the national technological incorporation should take place, developing activities in free collaboration with the countries that today have these technologies”*.

Table 2 PEN Goals

Accordingly, the Republic of Angola has already created an initial organic structure for space issues. The Interministerial Commission for the General Coordination of the National Space Program Office (created by Presidential Order No. 101/13, of 9 October) and the PEN Management Office (created by Presidential Decree No. 154/2013, of 9 October, and its Statutes were approved by Executive Decree no. ° 183/14, of 20 June).

The Interministerial Commission for the General Coordination of the National Space Program is responsible, among others, for monitoring the ANGOSAT project, for monitoring the management body of the PEN project portfolio and the study of the need and feasibility of setting up of an Angolan space agency.

In turn, the PEN Management Office aims, in particular, to respond to the need for a specific structure to manage the setting up of the various institutions that will integrate the PEN, having as mission “(...) *promoting the peaceful use of space cosmic, as well as the conduct of strategic studies that aim to establish agreements of cooperation with technical and scientific institutions in the space field, ensuring the creation of national technological and human competences, technology transfer and know-how in the framework of the National Space Program* ”.

Investment in space, having started with the ANGOSAT project as a genesis driving force of the PEN, and being already preliminarily framed in the ICT White Paper, it regards PEN, as clearly strategic goal of the Executive.

This Space Strategy is the next step on Angola's space path, aiming at defining the paths and outcomes to be pursued and additionally guaranteeing the structuring and coordination of Angolan space initiatives.

I.1.2. THE BENEFITS OF USING SPACE TO ACHIEVE STRATEGIC GOALS

The use of space contributes, in a transversal way, to the development of virtually all sectors of the economy. In addition to communications satellites, remote sensing satellites make it possible to better manage a State's resources in areas as diverse as agriculture, forestry and the mining of mineral resources, contributing to a better territorial planning and meteorological forecasting, and help in preventing and fighting disasters as well as in the defence and States security. The satellites navigation systems are in turn essential for traffic management.

The use of space brings numerous benefits in several areas:

Areas	Importance of using space
Improvement of Social Conditions	The use of communications satellites is relevant in accessing the Internet, television and radio, contributing to accessing information and building a participatory democracy. Satellite communications also have a relevant impact on the promotion of e-medicine and e-learning, especially in remote areas

Areas	Importance of using space
	In addition, satellite technologies and services (including satellite images, navigation and positioning services) allow “bringing space to people”, thus contributing to socio-economic development and the correction of social asymmetries and inequalities
Economic development and the private sector	The space sector is an effective engine for economic growth, both upstream (products and services for space activities) and downstream (derived from space activities, that is, products and applications that take advantage of space resources such as satellite images and navigation services positioning), contributing to the diversification of economic activity
State resource management	Earth observation from space contributes to the management, development of agriculture and forestry, the mining of mineral resources, the management of natural and cultural heritage. It also contributes to better territorial planning and the development of cartography, as well as meteorological forecasting
Defence and security, Fighting Disaster	Observation of space also plays an indispensable role in the States defence and security, by allowing their surveillance and monitoring (including borders), the collection of information, the prevention, fighting against crime and terrorism It is also essential in preventing and combating disasters, in managing humanitarian aid and in carrying out emergency communications. Navigation and positioning satellites also allow the management of land, air and sea traffic, and the associated technologies contribute to the automation of these tasks and the reduction of costs
Science and Research	Space exploration has brought many benefits not only to the knowledge of the universe, but also as a source of important scientific and technological advances, such as in health, medicine and material development. Furthermore, space exploration also promotes technological development in areas as diverse as energy (generation and storage), transportation, communications, navigation, robotics, environmental management and recycling, amongst others.
Source of revenue	Investment in space by States is an important source of revenue, including by possibility of renting capacity and selling satellite images and leasing orbital positions
International Prestige	Investment in space plays an important role in the international affirmation of States and in strengthening her sovereignty, prestige and influence

Table 3 Benefits of space usage

The benefits of using space are perfectly aligned with the strategic goals of Angola's Long-Term 2025, as well as the sectorial goals reflected in National Development Plan 2013-2017 and in its various sectorial plans and strategies.

Long-term goals Angolan national strategy 2025	Social condition	Economic development	State resources management	Defence and safety	Research and science	Revenue sources	International prestige
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Long-term goals Angolan national strategy 2025	Social condition	Economic development	State resources management	Defence and safety	Research and science	Revenue sources	International prestige
• Ensuring national unity and cohesion							
• Harmoniously develop the national territory and build a democratic and participative society • Promote the human development and well-being of Angolans • Promote sustainable, competitive and equitable development							
• Promote science, technology and innovation development • Support the development of entrepreneurship and the private sector							
• Promote the competitive insertion of the Angolan economy in the global and regional context							

Table 4 Benefits of using space for strategic goals Angola 2025

Areas		Contribution of space activities
Clusters	Food and agro-industry; energy and water; transport and logistics; housing	Use of satellite images and navigation systems to ensure sustainable exploitation of natural resources, monitor natural and cultural heritage, register forests and arable land, manage environmental threats, plan and build energy, water and transport networks, manage water resources, manage land, sea and air traffic
	Geology, mines and industry; oil and; natural gas; tourism and leisure; forestry; telecommunications and information technologies	Development of satellite communications, as well as products and services that use space technologies and are accessible to the population, promoting greater inclusion and digital participation
Other areas	Education, Science and Technology	Capacity building in scientific and technological areas, including in areas more associated with space (for example, satellite operation) and promotion of projects in this field
	Spatial planning and urban, construction	Use of satellite images and navigation systems for registration, topographic surveys, urban centre planning and construction of infrastructure and routes
	Health	Development of satellite communications for e-medicine purposes
	Defence	Use of satellite images, navigation systems and satellite communications to monitor the territory and fight crime

Table 5 Contribution of space activities to Angolan clusters and strategic areas

The investment that the Republic of Angola is making in the country's socio-economic development demands that the Angolan State resort to space in a structured way, at the risk of missing lacking an essential tool for promoting it. This Space Strategy is therefore indispensable to define the position of the Angolan State in the space sector and to structure the main measures to be taken in this context, taking into account the numerous benefits of using the space.

I.1.3. THE GROWING INTERNATIONAL POSITIONING IN THE SPACE SECTOR

The space sector is a growing object of international investment, not only by States, but also by private entities.

A multiplicity of countries are developing their space activity with a view to promote their socio-economic development and international affirmation. A high number of countries are members of COPUOS (Committee for the Peaceful Use of Ultra-terrestrial Space (*“Committee on the Peaceful Uses of Outer Space”*) Of the United Nations - which constitutes the international reference forum for discussion of related topics with the civil use of space - and has invested in projects, programs and initiatives space (often through partnerships with other countries) as well as participation in international organizations in the various areas of spatial relevance (such as the remote sensing, navigation, positioning, communications, science and investigation).

This trend is also seen on the African continent, and it is certain that the African Union is very active in this field and that there are several regional initiatives and projects space.

From the outset, the African Union recently approved the Strategy and Africa Policy Space, which aim to create an African space program that includes capacity building for professionals, the implementation of regional training networks and the development of an African space industry and technologies that respond to the needs of the continent (for example, disaster response). The approval of an adequate framework regulatory that respects international treaties is also referred to. The AU understands that Africa's participation in the development of space applications and services will enable the continent to address its challenges and achieve the goals of Agenda 2063, forming integral part of the implementation of the African strategy for science, technology and innovation. The documents expressly mention that more than 90% of the strategic goals of the AU commissions rely on space applications for their effective implementation.

In addition, the “space economy” is a sector with increasing benefits associated with the resulting products and services, as well as the generated knowledge and training. Indeed, technology derived from the use of satellites has triggered numerous applications in several areas, from transport to natural resources, from entertainment to agriculture, consequently generating new markets.

Hence, which is increasingly dynamic and active at the spatial level, the starting of Angolan Republic in this sector is an urgent need. In this regard, it is necessary to proceed with the approval of strategic measures to guide Angolans space activities and to follow international trends in this field, positioning the country in definitive and central stage in the space sector.

I.2. THE GOALS OF SPACE STRATEGY

The goals of the Space Strategy of the Republic of Angola are:

1. To define in a structured way the main strategic axes and macro measures that they must guide the State's activities in the space sector until 2025;
2. To guide the development of space activities in a central, agglutinated and converging, avoiding the dispersion and duplication of efforts, goals, resources, articulating and optimizing the contributions of the various sectors
3. Ensuring the use of ultra-terrestrial space as an instrument of country development and the strengthening of Angola's international position;
4. Ensure Angola's independence in the space sector in terms of services, products, technologies and human resources;
5. Ensure the sustainability and stability of space investment in Angola;
6. Ensure the transparency and predictability of Angolan space activities; and
7. Ensure the recognition by the Angolan population of the importance of investment in the use of ultra-terrestrial space.

II. THE NATIONAL SPACE STRATEGY

II. THE NATIONAL SPACE STRATEGY

The Space Strategy of the Republic of Angola aims to guide the country in its investment in space with a view of ensuring the effective use of its benefits and positioning Angola in the international context, based on five pillars or fundamental strategic axes:

- The development of a space infrastructure;
- Capacity building and promotion of the space sector;
- Industrial growth and space technologies;
- The international affirmation in the Angolan State in the space domain; and
- The internal creation of organizational structures that ensure the pursuit of the intended goals.

The Space Strategy indicates, for each of these axes, strategies and action measures concrete steps that will lead to the implementation of the broad guidelines stated in this document.

II.1. VISION AND MISSION

Vision 2025

Angola will be a country with space infrastructures, with scientific, independent and sustainable national technological initiatives in this field, which takes advantage of effectively promote, socio-economic development - placing space at the service of citizens, industry and the State - for a leadership and cooperation in the regional and international setting.

Mission

To establish a progressive and sustainable path for the development of space activities in Angola for the benefit of the country's socio-economic progress, competitiveness and innovation of the national industry, of independence, the enhancement of human capital and strengthening Angola's international positioning.

II.2. PRINCIPLES

Angolan space activities are guided by the following central principles:

- 1 Use of ultra-terrestrial space for peaceful purposes, in accordance with the provisions of United Nations international treaties on space
- 2 National and international cooperation
- 3 Transparency of space activities
- 4 Safeguarding sustainability and the space environment taking into account the interests of other States in the use and exploration of space
- 5 Access, use of space and space resources by public and private agents taking into account for international and national standards
- 6 Use of space to promote socio-economic and industrial development, technological and scientific of the country

II.3. STRATEGIC AXES

II.3.1. AXES AND GOALS

The present Space Strategy is divided into five central strategic axes, which are the master lines that constitute its spirit and that guide execution thereof.

These guidelines aim to frame and systematize the way forward to achieve the goals of this Strategy, thus ensuring the central and convergent definition of a multitude of very ambitious measures in the space sector.

The strategic axes that the Executive considers central to the pursuit of the Vision, Mission and goals of the Space Strategy are indicated in the following table:

1. Space Infrastructure	2. Training and Promotion	3. Industry and Technology	4. International Positioning	5. Organization and Cooperation
Infrastructure Development with a technology using satellite media to support provision, access and use of means, products and services in different sectors	Promotion of training and research in the area of science and technology with relevance in the space sector with a view of creating specialized resources and training users of space products and services	Promotion of the development of technological industries oriented towards the space sector, as well as space activities, products and services	Angola's positioning in the international and regional community in the space sector, including relevant initiatives in this field	Creation of structures with stable skills in the space sector and permanent dissemination of Angolan space activities

Table 6 Strategic space axes

Axis 1 (Spatial Infrastructure) has the main purpose of ensuring that Angola has a stable network of satellite resources and services in several domains that ensures her technological and satellite data independence.

Axis 2 (Training and Promotion) has as main goal to speed up the development and use of space products, services and applications, ensuring that capacity building, training and dissemination of activities in this field contributes to the creation of specialized human capital resources and, consequently, for the development of the country.

Axis 3 (Industry and Technology) has as main goal to ensure the private initiative in the space sector, aiming to diversify investments in space and contribute to the development of this sector.

Axis 4 (International Positioning) has as main goal to guarantee that the Republic of Angola assumes a relevant role in the international context in space, in order to ensure that the country contributes to the definition of the main guidelines in this field and participates in relevant initiatives and projects.

Axis 5 (Organization and Cooperation) aims to ensure that the implementation of Space Strategy measures are carried out centrally and coordinated by creating an organic ecosystem that leads, promotes and monitors the lines of action strategy.

Each of these Axes integrates short- medium and long-term strategies and lines of action, as stated in more detail in Chapter III. The stated deadlines aim to ensure that in 2025 each of these Axes are executed and/or in execution, and that the activity of the Republic of Angola will continue in a sustainable and effective manner under the space strategies and programs that follow this document after 2025.

The Executive believes that all strategic axes must begin to be implemented in the short-term, with its conclusion depending on its concrete nature, given that there are strategies and measures that require continuous work to position the Government and of the Republic of Angola at national and international level.

Axis		Short-Term 2016-2018	Mid-Term 2019-2025	Long -Term 2022-2025
1	Spatial infrastructure			
2	Training and promotion			
3	Industry and technology			
4	International positioning			
5	Organization and cooperation			

Table 7 General deadlines for implementing the Strategic Axes

- High number of strategic measures to be initiated and/or executed in this timeframe
- Intermediate number of strategic measures to be initiated and/or executed in this timeframe
- Reduced number of strategic measures to be initiated and/or executed in this timeframe

This Strategy aims, in summary:

- That space technologies be used in the short term to respond to the country's needs, including in the communications sector, in traffic management, and in the monitoring and management of the territory
- That in the medium term invest in major scientific and technological space enterprises
- The country might invest in the creation of space vehicles in the long term and ensure its autonomy in access to space

The following points develop each Axis in more detail and already indicate the respective guidelines.

1. SPACE INFRA-STRUCTURE		
GOALS	BENEFITS	STRATEGIES
<ul style="list-style-type: none"> • Development and modernization of the Angolan State's satellite communications infrastructure • Expansion of the use of digital content and services necessary for social development, e.g.: e-health, e-learning • Promotion and centralization of using satellite images • Effective use of all space resources in Angola • Expansion in the use of navigation and positioning resources and applications • Angola's independence and autonomy in matters of communications and the use of satellite images, as well as in the use and exploration of space 	<ul style="list-style-type: none"> • Access to communications services throughout the national territory - greater coverage with reduced costs and higher quality • Increased capacity to address the country's needs in a central and structured way and to promote socio-economic development through the use of satellite technologies • Obtaining revenues and/or reducing costs in the use of Angola's space resources through the sustained exploitation thereof • Space easy access and instruments and applications 	<p>In terms of communications:</p> <ol style="list-style-type: none"> 1.1. Communications satellite ANGOSAT 1 and future satellites 1.2. National satellite communications system <p>In terms of remote sensing/Earth observation:</p> <ol style="list-style-type: none"> 1.3. Earth Observation Program 1.4. Remote sensing satellites (observation Earth and meteorology) and/or receiving ground stations 1.5. Geographic information system (GIS) <p>Regarding orbital positions:</p> <ol style="list-style-type: none"> 1.6. Exploration program for orbital positions regarding satellite positioning and navigation: 1.7. Development program for, and/or participation in satellite positioning and navigation systems <p>Regarding spatial autonomy:</p> <ol style="list-style-type: none"> 1.8. Autonomy program of the Angolan State access to space

Table 8 Strategic axis 1 Spatial infrastructure

The first Axis of the Space Strategy of the Republic of Angola is concerned with space infrastructure. The promotion of the development of satellite networks as well as the structuring of satellite use of space resources are fundamental elements to position Angola in a sustainable way in the space sector.

This goal covers the three main areas of use of satellites: communications (which constitute the initial focus of the Space Strategy with the ANGOSAT project), remote sensing (either by making the country autonomous by launching its own satellites, or by a structured program for the use of satellite data) and navigation (namely through the development/integration of Angola in projects correlated to this field). Additionally, it is fundamental to define the conditions for the exploration of the orbital positions attributed to Angola and obtaining orbital positions that support Angolan satellites, as well as ensuring the independence of the Angolan State in access to space (either through investment in vehicles and launching centres, or through the establishment of stable partnerships for this purpose).

2. TRAINING AND PROMOTION

GOALS	BENEFITS	STRATEGIES
<ul style="list-style-type: none"> Creation of specialized human capital in the scientific and technological sector Creation of training and research structures in the space sector Promotion and fostering of digital content and services as derivatives of the space sector, including e-medicine and e-learning To create awareness of the Angolan population to the benefits of investing in space and active involvement in the space initiatives of the Angolan State 	<ul style="list-style-type: none"> Angola's independence in terms of human resources as the basis for an active and innovative industry and academy Increase in the use of digital products and services by the population Improving the efficient functioning of state structures Support from the Angolan population in regards to space investments in Angola as an instrument of national union and pacification 	<ol style="list-style-type: none"> National program training and space certification Angolan Centre for Space Studies Promotion of the use of resources, services and space products in the public and private sector Space program activities dissemination

Table 9 Strategic axis 2 Training and promotion

The second Axis of the Space Strategy concerns training and promotion. Training with a view to creation of a self-sustainable base of experts, technological users and citizens' information is an essential tool for the success of the Space Strategy.

This goal is achieved, on the one hand, through the creation of a structured program of capacity building in space that covers the essential scientific and technological areas in this domain and, on the other hand, through the training of end users. In addition to the need for allocate efforts to ensure that current education and training institutions invest in these sectors, the Executive also considers it relevant to centralize the path in this area through an Angolan Centre for Space Studies. Additionally, training through practical experience in projects, namely in the construction and operation of small scientific satellites (Cubesat) in academic context, will play a very relevant role.

Finally, it is essential to create proper environment for investment in space activities. To this end, it is necessary to publicize the activities of the Angolan State in this field and raise awareness of Angolan population for the benefits of using space. The execution of this purpose additionally contributes to ensuring the sustainability of space activities by allowing the creation of a stable base for citizens who support and want to be involved in this sector.

3. INDUSTRY AND TECHNOLOGIES

GOALS	BENEFITS	STRATEGIES
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<ul style="list-style-type: none"> • Development of a competitive industry in space, science and technology 	<ul style="list-style-type: none"> • Sustainability of the space sector through a participatory and active private sector 	3.1. Space Industrial National Program
<ul style="list-style-type: none"> • Promotion of entrepreneurship and innovation 	<ul style="list-style-type: none"> • Growth of revenues and investment in Angola, as well as exports of products and services 	3.2. Private space sector Support
<ul style="list-style-type: none"> • Promotion of research and technological development through the creation of digital content, services and applications for the benefit of society 	<ul style="list-style-type: none"> • Angola's independence in the space, scientific and technological sector 	3.3. Clear and predictable regulatory framework
<ul style="list-style-type: none"> • Promotion of cooperation and technology transfer in the space sector 	<ul style="list-style-type: none"> • Angola's capacity to contribute decisively to collaborative projects in the space, scientific and technological sector 	3.4. Standardization and certification of products and space services
	<ul style="list-style-type: none"> • Security and recognition of Angolan space products and services 	

Table 10 Strategic axis 3 Industry and technology

The third Axis of the Space Strategy of the Republic of Angola concerns industry and technology. The promotion of a technological industry with a focus on the space sector and associated areas constitutes an indispensable tool to ensure the pursuit of Angola effective development goals and support the investment of the Angolan State in the space sector.

This goal aims to promote a national industrial program that ensures that private investment is sustainable in strategic areas for Angola, while recognizing the need for support from the Angolan State in promoting private initiative, taking into account in particular the pioneering role, in Angola, of the Government in launching activities and the space sector. On the other hand, creating conditions in terms of standardization and certification of products and services will facilitate its transversal use, including by other States and entities present in the space sector.

The Executive additionally recognizes that the success of private investment requires a clear and predictable regulatory framework that contributes to making the country an attractive centre for companies and investors.

4. INTERNATIONAL POSITIONING

GOALS	BENEFITS	STRATEGIES
<ul style="list-style-type: none"> Angola's position in the international space community Ensuring Angola's independence in the use and exploration of space Angola's participation and leadership in regional space projects and initiatives Promotion of international cooperation in space projects 	<ul style="list-style-type: none"> Angola's contribution in defining the paths and standards to be adopted in the space sector by international and regional bodies, thus ensuring the safeguarding and defence of the country's interests Greater visibility, prestige and international recognition of Angola, with an impact not only at the spatial level but in all sectors and areas relevant to the Angolan economy, politics and diplomacy 	<ol style="list-style-type: none"> Position of the Republic of Angola in the United Nations, namely in the areas and initiatives dealing with the space sector Position of the Republic of Angola in African Union in space matters Angola's participation in organizations, international projects and initiatives Bilateral and multilateral partnerships

Table 11 Strategic axis 4 International positioning

The fourth axis of the Space Strategy of the Republic of Angola concerns the International positioning. The strengthening of the role of the Angolan State in the international context through its participation and/or leadership in the space sector is an indispensable vector considering the supranational or intergovernmental character of most strategic initiatives and decisions in space matters.

This goal aims, first of all, to position Angola in the United Nations, the main forum in space matters. Additionally, it also aims, to ensure a prominent role for Angola in the interventions of the African Union in space matters.

On the other hand, the country's international position also requires Angola's participation in complex projects involving different agents from different states, thus allowing Angola to integrate innovative and challenging projects, contributing simultaneously for internal training, the development of her industry and the autonomy of space sector.

5. ORGANIZATION AND COOPERATION		
GOALS	BENEFITS	STRATEGIES
<ul style="list-style-type: none"> Centralization in a specialized organic structure of the definition and execution of investment and space activities of the Angolan State Guarantee of the recognition and use, in each sector under the 	<ul style="list-style-type: none"> Articulation and optimization of space investments Simplification and standardization of policies for the use of space resources across the government 	<ol style="list-style-type: none"> Angolan spatial institutional structure Sectorial resource utilization plans, space images, products and services Cooperation and information sharing

supervision of the Government space resources

- Guarantee of the benefits of investing in space in favour of all sectors of activity in the country

Table 12 Strategic axis 5 Organization and cooperation

The fifth Axis of the Space Strategy of the Republic of Angola concerns organization and cooperation. The effective pursuit of the goals of the Space Strategy can only be achieved with the guarantee of existence of a structure that defines monitors, executes and enforces the measures proposed in space matter.

This goal therefore aims to ensure that a specialized structure in the space area guarantees the compliance with the lines of action contained in this Strategy.

Additionally, the Executive believes that it is essential to ensure that all public agents organizations to actively intervene in the purpose of developing space activities in Angola, therefore it is recommended in this respect the elaboration of sectoral plans with a focus on use of space resources.

Finally, the success of the Space Strategy is also dependent on regular cooperation between various members of the Government and their agencies, institutes and the like, with a view to ensure that benefits of space are permanently at the service of all sectors and the entire Angolan population, responding to its needs and contributing to the development.

II.3.2. THE ALIGNMENT OF AXES WITH THE STRATEGIC ANGOLA GOALS

The Strategic Axes indicated are fully in line with the Long-Term goals of Angola National Strategy 2025, thus making it clear that investment in space is an indispensable tool to achieve these goals.

Thus:

Long-term Goals Angola 2025 National Strategy	Strategic Axes				
	Axis 1 Spatial Infrastructure	Axis 2 Training and promotion	Axis 3 Industry and Technology	Axis 4 Position intern.	Axis 5 Organization and cooperation
Ensuring national unity and cohesion					
Harmoniously develop the national territory, build a democratic and participative society, promote					

Long-term Goals Angola 2025 National Strategy	Strategic Axes				
	Axis 1 Spatial Infrastruture	Axis 2 Training and promotion	Axis 3 Industry and Technology	Axis 4 Position intern.	Axis 5 Organization and cooperation
human, sustainable, competitive and equitable development					
Promote the development of science, technology and innovation, support the development of entrepreneurship and the private sector					
Promote the competitive insertion of the Angolan economy in the global and regional context					

Table 13 Alignment of strategic axes with the Angola 2025 goals

Each of the Strategic Axes is also indispensable to achieve the goals sectors of the National Development Plan 2013-2017:

Clusters and areas	Strategic Axis				
	Axis 1 Spatial Infrastruture	Axis 2 Training and promotion	Axis 3 Industry and Technology	Axis 4 Position intern.	Axis 5 Organization and cooperation
Telecommunications and IT					
Education, Professional Training and Higher Education					
Science and technology					
Food and Agro-industry, Energy and Water, Transport and Logistics, Housing					
Geology, Mines and Industry, Oil and Natural Gas, Tourism and Leisure, Forestry / Environment					
Spatial Planning and Urbanism, Construction, Health and Defence and Security					

Table 14 Spatial Planning and Urbanism, Construction, Health and Defence and Security

In short, the Space Strategy will allow the Republic of Angola to build an ambitious space structure and sustainable as an instrument for its socio-economic progress and international level affirmation, so fulfilling, in an effective and innovative way, the general and sectoral strategic purposes of the country.

II.4. STRATEGIES AND ACTION LINES

Each of the strategic spatial Axes unfolds, as we have seen, in several strategies. These strategies, in turn, must be executed through a concrete paths, lines, action plans which will ensure that the present Space Strategy is the general guidelines that will allow the construction of the Angolan space structure.

The following indications contain the lines of action that the Executive believes should be implemented to pursue the Axes of this Space Strategy.

1. SPATIAL INFRA-STRUCTURE		
STRATEGIC	ACTION LINES	EXPECTED RESULTS
1.1. Communication Satellite ANGOSAT 1 Future satellites	1.1.1. Launch of ANGOSAT 1	<ul style="list-style-type: none"> • ANGOSAT satellite launched and operational • Operation of the ANGOSAT satellite autonomy in Angola • Best communication at the territory, particularly in rural areas • Approved conditions for launching new defined satellites and • Increase of revenue through the availability of capacity to national and foreigners' operators • Strengthening influence and strategic value of the country through the availability of capacity to foreign operators
	1.1.2. ANGOSAT 1 operation in Angola with Angolan resources	
	1.1.3. Study of the need and viability of more Angolan communications satellites	
	1.1.4. Survey of national and foreigners' operators to use the capacity of Angolan communications satellites	
1.2. National Satellite communication system	1.2.1. Survey of the state of the land segment of INFRASAT1	<ul style="list-style-type: none"> • Modern and updated terrestrial satellite network • Best communication at the territory, particularly in rural areas
	1.2.2. Definition of the restructuring needs of the land segment	
	1.2.3. Rehabilitation and expansion, if necessary, the land segment	

Table 15 Axis 1: Communication Strategies

These first guidelines of the Space Strategy aim to ensure that Angola endows herself with a network of satellite communications covering the entire national territory, hence ensuring access to communications for the entire population, mitigating regional asymmetries and ensuring digital inclusion.

The Executive therefore understands that communications should be the driving force behind the investment in space due to the potential inducer and generator of resources that they represent currently for the national economy.

In short, the aim is to ensure the expansion of the coverage of communication services throughout the territory including support for e-government, e-learning, e-medicine services, among others, as well as the expansion of the national broadcasting infrastructure to support digital migration.

It should be recalled now, that Article 4 of Executive Decree No. 183/14 indicates that the Management has the duty of promoting and coordinating the development strategies of the satellite national communications system, in coordination with the ongoing project of the ANGOSAT, is indicative of the central character of the implementation of a communications spatial infrastructure.

1. SPATIAL INFRA-STRUCTURE		
STRATEGY	ACTION LINES	EXPECTED RESULTS
1.3. Earth observation program	1.3.1. Survey of all public entities (ministries, regulators and agencies) that use satellite images 1.3.2. Survey of satellite image providers 1.3.3. Analysis of licensing/use conditions of images and their purposes 1.3.4. Definition of priority sectors and goals in the use of satellite imagery 1.3.5. Definition of the models for obtaining, using and availability of satellite images by public entities 1.3.6. Lifting initiatives and projects in this field	<ul style="list-style-type: none"> • Conditions in getting, use and availability of satellite images in and by the public sector defined and implemented in transversal form • Priority use areas for defined satellite images • Participation of the Republic of Angola in regional and international projects in this area, with benefits in matter of international positioning of the country and obtaining satellite images for the relevant selected areas
1.4. Remote Sensing Satellites (Earth observation and meteorology) and / or receiving ground stations	1.4.1. Feasibility study for the construction and launching of remote sensing satellites by the Angolan Government 1.4.2. Study of the feasibility and need for the installation of ground stations for direct reception of satellite images 1.4.3. Determination of construction conditions, launching and operation (orbits, partners, deadlines)	<ul style="list-style-type: none"> • Construction conditions and launching of satellites of meteorology and Earth observation, as well as the installation of ground stations, defined and approved • Autonomy of the Angolan State in obtaining and using images in satellite, with savings in costs and possibility of obtaining revenues by making satellite images available to third parties
1.5. Geographic Information System (GIS)	1.5.1. Registration of all public entities (ministries, regulators and agencies) that use geographic information Study of the development model of an	<ul style="list-style-type: none"> • GIS model and conditions defined and approved • Centralization and greater ease

1. SPATIAL INFRA-STRUCTURE		
STRATEGY	ACTION LINES	EXPECTED RESULTS
	Angolan geographic information system 1.5.2. Definition of the entity responsible for accommodation, management, updating and making available geographic information through the GIS (IGCA) 1.5.3. Approval of legislation on this matter 1.5.4. Definition of the conditions for licensing/availability of GIS within the public and private sector.	in the use of geographic information in Angola <ul style="list-style-type: none"> Improvement of processes, practices and policies that require use in geographic information

Table 16 Axis 1 Remote sensing strategies

These Space Strategy guidelines aim to provide the Republic of Angola with an autonomous system in terms of Earth observation and meteorology, with a view of facilitating obtaining and using structured satellite imagery to respond to the country's challenges and the strategic goal of reducing foreign dependence on obtaining meteorological, climatic and territorial information, which will enhance the sustainable exploitation of natural resources, mitigating the adverse effects of natural disasters and integrate the country into the satellite imagery market.

In this context, the Executive believes that it is necessary to define the strategy for the collection and treatment of spatial data, the use and sharing of data between State agencies and the creation of data repositories and central GIS instruments for data collection, processing and distribution. As well as the provision of free use of data for disaster response purposes, constitutes a fundamental element to take into account. On the other hand, the themes of licensing and classification of data is also relevant in order to ensure the adoption of common international standards (it is important to highlight, in this respect, the competences of the National Institute for Standardization, Quality and the National Metrology Institute) and facilitate the use of satellite images.

1. SPATIAL INFRA-STRUCTURE		
STRATEGIES	ACTION LINE	EXPECTED RESULTS
1.6. Orbital Positions Exploration Program	1.6.1. Analysis of the value of Angolan orbital positions 1.6.2. Study on the usefulness of its use by the Angolan State and private individuals 1.6.3. Determination of operating models applicable 1.6.4. Obtaining suitable orbital positions for the Angolan satellites	<ul style="list-style-type: none"> Operating conditions for defined and approved orbital positions Increase of revenue through the availability of orbital positions and/or capacity of satellites placed in orbit to third parties Viability of Angolan satellite infrastructure

Table 17 Axis 1 Strategy for exploring orbital positions

This strategic orientation aims to respond to the measures already contained in other strategic plans of the Angolan State, namely the ICT White Paper, which indicates, in point 3.1.3.3., The Following:

“In the field of electronic communications, scarce resources constitute the radio spectrum, orbital positions, numbering and IP domain. The Executive will ensure through legislation that these important resources remain as part of the public domain and as such subject to strict, transparent and auditable management criteria, aiming at their rational and parsimonious at the service of the integrated development of electronic communications in Angola.”

In point 3.2.1.1., The ICT White Paper further states the following: *“The Executive will pursue a policy of responsible use of satellite orbits ...”*.

The Electronic Communications and Information Society Services Law (Law No. 23/11, of June 20), in turn, also indicates that *“The incumbent of the Executive Branch is responsible for ensuring management and administration of orbital positions assigned to Angola”*, and emphasizing that *“At Specific conditions for the use of orbital resources are defined in a specific diploma of the Head of State”*.

Therefore, the Executive considers it essential to define how to manage and use the orbital positions by and from the Republic of Angola, in two aspects:

1. Conditions for using orbital positions pre-assigned to Angola:

UIT Regulation 30/30A	UIT Regulation 30B
- 24.80	- 36.10

Table 18 Angolan orbital positions

In this regard, the Executive recommends carrying out a study that points out the main paths in this field, namely to:

- Determine the feasibility of exploring the pre-assigned orbital positions;
- Determine the procedures applicable to its attribution/licensing, if intends to proceed to its attribution to private entities; and

- Identify possible stakeholders.

2. Additionally, the Executive also understands that it is necessary to address the issue of orbital positions not pre-assigned to Angola, in two ways:

- On the one hand, to ensure that Angola obtains favourable orbital positions for the placement of satellites in orbit, by studying the intended orbital positions for the development of its spatial infrastructure;
- On the other hand, to evaluate the approval of procedures that allow a private entity to require the allocation of orbital positions not pre-allocated to the ITU through the Republic of Angola, taking into account the goals that are defined by the Angolan State for this sector.

The first aspect mentioned requires Angola's active participation in the ITU/field of orbital positions as an indispensable condition for the sustainability of its space activities.

In turn, and regarding the second aspect, it should be noted that the approval of rules in this area will contribute to the promotion of private space activity from Angola. On one hand, in the short and medium term, investment in national training could result in the launch of Angolan private satellites (Cubesat academic satellites), which also require the assignment of orbital positions. On the other hand, in the medium to long term, the adoption by Angola of stable and transparent regulatory frameworks rules, can contribute to attracting foreign investment, which will choose Angola as their jurisdiction for assigning orbital positions.

1. SPATIAL INFRA-STRUCTURE		
STRATEGIES	ACTION LINES	EXPECTED RESULTS
1.7. Program for the development of, and/or participation in, satellite positioning and navigation systems	1.7.1. Survey of international satellite positioning and navigation initiatives 1.7.2. Evaluation of the Angolan State's participation in selected initiatives 1.7.3. Assessment of the feasibility of a strategy for development of satellite positioning and navigation systems, especially within the African Union, led or participated by Angola	<ul style="list-style-type: none"> • Model of investment and participation in navigation and positioning projects defined and approved • Improvement of processes, practices and policies that require positioning and navigation information • Participation of the Republic of Angola in regional and international projects in this area, with benefits in international positioning matter of the country and obtaining relevant information in this

1. SPATIAL INFRA-STRUCTURE		
STRATEGIES	ACTION LINES	EXPECTED RESULTS
		field <ul style="list-style-type: none"> Autonomy of the Angolan State in terms of navigation and positioning

Table 19 Axis 1 Navigation and positioning strategy

This orientation of the Space Strategy focuses on the third central area in terms of the use of satellites in addition to communications and remote sensing: navigation and positioning.

The Executive believes that Angola's positioning in the space sector requires the country to evaluate the navigation and positioning projects in which it can participate and determine the conditions of its participation or leadership in this area, taking into account the benefits of using space for land, air and sea navigation.

1. SPATIAL INFRA-STRUCTURE		
STRATEGIES	ACTION LINE	EXPECTED RESULTS
1.8. Program autonomy of the Angolan State in accessing space	1.8.1. Survey of expected investments by 2025 in the development of Angolan space infrastructure 1.8.2. Survey of the expected activity in Africa with regard to space, namely in launching space and suborbital objects 1.8.3. Assessment of utility and feasibility, investments expected in Angola, to guarantee the autonomy of the State and Angolan agents in accessing space 1.8.4. Evaluation of utility and feasibility, given the expected international activity, to offer services for access to space 1.8.5. Determination of the most suitable models for Angola in access to space, namely (i) international cooperation/selection of permanent partners in this field or (ii) creation of a program to develop centres for the construction and launching of space objects, as well as launching vehicles - also taking into account the country's geographical position	<ul style="list-style-type: none"> Study on the feasibility of Angola's investment in launching centres and completed vehicles Autonomy of the country's access to space (possibility of launching satellites from Angolan territory) Increase of revenue through the provision of services in this domain Reinforcement of Angola International positioning

Table 20 Autonomy strategy in access to space

The present orientation of the Space Strategy aims to ensure that Angola evaluates investing centres and launching vehicles as an integral part of the construction of its space building (namely construction and testing centres for components and equipment, telemetry ground stations, tracking and command to support space operations and data recovery, mission control).

The Executive trusts that investment in these areas is of strategic importance as it guarantees the country's autonomy in accessing space, at the same time it will contribute by providing resources that can be competitive in the international market (namely for launching microsattelites for commercial purposes and satellites for scientific and technological missions).

In this regard, it is important to note that investment in this area will require careful analysis of a set of internal and external conditions of the country, namely the necessary costs for this investment and the potential success of Angola in offering this type of services - referring that the Angola's positioning close to Ecuador could be an advantage for this purpose. The coordination of this type of investment within the African Union may prove to be appropriate in order to ensure that, in deciding to move forward in this area, there is already a client base in the Africans countries and the AU for that purpose.

In short, Angola's investment must take into account the potential for investments, synergies that can be created with other areas (such as aeronautics) and the international and regional context.

2. TRAINING AND PROMOTION		
STRATEGIES	ACTION LINES	EXPECTED RESULTS
2.1. National space training and certification program	2.1.1. Registration of institutions and training/education centres in Angola	<ul style="list-style-type: none"> Increased awareness of the areas of science, technology, engineering and mathematics in Angola Training in areas of science and technology applied to space, as well as specific training in the space sector, in the scientific and technological faculties of the country Concluded agreements and partnerships for training and capacity building with selected international entities, agencies and centres Implemented cooperation models between industry and universities Certification system for courses and space professionals implemented Professionalization of Angolan human resources in the area of space
	2.1.2. Survey of training offers in relevant areas to space activities	
	2.1.3. Survey of Angolan resources with training in the relevant areas and their degree of specialization	
	2.1.4. Surveying of Angolan resources specialists working in Angola and abroad	
	2.1.5. Definition of training offers relevant to the (bachelor's, master's, doctorate and specializations) and identification of institutions and centres that will make them available	
	2.1.6. Integration into curricula at all levels of teaching subjects with relevance to the space sector (Sciences, technology, engineering, mathematics) and teacher training	
	2.1.7. Capacity building of institutions and centres in the space sector, including laboratories and research institutes (such as by allocating human and material resources) and promoting cooperation between them	
	2.1.8. Creation of grants for the space sector, including exchange and cooperation scholarships with foreign institutions	

2. TRAINING AND PROMOTION		
STRATEGIES	ACTION LINES	EXPECTED RESULTS
	2.1.9. Development of distance education programs focusing on the space sector 2.1.10. Promotion of cooperation models and transfer of technology with the business sector, including professional courses and internships in national and foreign companies 2.1.11. Definition of models and certification bodies for courses and professionals that creates confidence in the market	<ul style="list-style-type: none"> • Angola's autonomy in space human resources • Internal and international confidence in Angolan space capabilities
2.2. Angolan Centre for Space Studies	2.2.1. Implementation of Angolan Centre dedicated exclusively to the space sector 2.2.2. Definition of its attributions, location, financing and supervision 2.2.3. Definition of cooperation models with education / training institutions and centres in Angola, with foreign entities and with the private sector, including by incubating space sector companies	<ul style="list-style-type: none"> • Angolan Centre for Space Studies created • Specific training in relevant areas to the use and exploration of space • Substantial focus on space, with an impact on Angola's international positioning
2.3. Promotion of the use of space resources, services and products in the public and private sector	2.3.1. Training of ministries officials, regulators and agencies for the use of space resources, images, services and products 2.3.2. Products users training space and spaces services in the technological domain	<ul style="list-style-type: none"> • Civil servants, companies and end users trained in the use of space services and technologies • Increased market for space products and services • Improvement of socio-economic conditions

Table 21 Axis 2 Training strategies

The aforementioned guidelines of the Space Strategy concern training and capacity building in the spatial area in Angola, as a fundamental instrument for investment in space. The executive considers that the training of space specialists is an essential factor in ensuring the sustainability and success of the Space Strategy.

In this regard, it should be recalled that Article 2 (b) of Presidential Order No. 101/13 indicates that Interministerial Commission is responsible for ensuring the training and qualification of human resources. The fact that the Minister for Higher Education is part of the Interministerial Commission is also indicative of the importance of this Axis in the space domain.

Additionally, Executive Decree No. 183/14 points out that the Management Office is responsible for “promoting and foster the transfer, diffusion and development of space science and technology, guaranteeing the binomial university and national space industry ”, establish protocols for cooperation with technical and scientific institutions in the space field ” and ” promote the involvement of the national academic and scientific research sector”. It is therefore certain that this

Axis constitutes a fundamental step for the presence of Angola in space to be competitive and for the Angolan space activities companies to have a secure support base.

It is to note that, the Executive is certain about the implementation of a national training program, to structure coordinated training models in the space area, including in terms of training/cooperation entities/centres with industry, will be an essential instrument for guiding investment in this area, gradually ensuring Angola's independence in the space sector, all the more relevant as new satellites are launched (with a view to ensuring construction with national resources) and to operate them (in order to allow their independent operation in Angola).

The training of Angolan resources should focus not only on technological and scientific general issues (such as physics, mechanics, aerospace engineering, geodesy, meteorology, climatology, cartography and, still, in other subjects associated with the exploration of the solar system, such as astrophysics, cosmology, physics, geology, geophysics, among others), but also in areas with a direct impact on the space sector (systems, subsystems and components, instrumentation, mission analysis, operation and control of satellites, telemetry, tracking and command, navigation and landing, propulsion, quality and certification, integration and testing, among others). Therefore, remember the advent of Cubesats, whose reduced costs and short development times translate into ideal opportunities for training students, engineers and scientists in the fields of engineering, software and mathematics.

In this perspective, the Executive is confident that the development of scientific and technological satellites could also play a very important role in Angola, moreover not only in terms of capacity building, but also for the purposes of scientific and technological missions (for example, atmosphere, ionosphere and fields - gravimetric and magnetic - and research of new materials and processes in a microgravity environment), with interest for the academic and Angolan industrial communities. The investment in these areas will make it possible to foster scientific and technological experiences with strategic nature for national space systems and for the advancement of science and technology space in the country.

The Executive considers that the Angolan Centre for Space Studies should have an increased responsibility by carrying out research and studies related to space sciences, by developing independent Angolan space applications (namely in the areas of communications, geophysics, astronomy, meteorology, Earth observation and monitoring, among others) and for ensuring an effective technology transfer process with the space industry. In this regard, the approximation between academia and industry should be promoted with a view of ensuring technology transfer developed by institutes and research centres for space sector companies.

In short, the Executive believes that it is necessary to guarantee indigenous space capabilities in the country ensuring the development and implementation of independent space programs and effective projects.

On the other hand, the training of the Angolan population not only as space professionals, but also as users of space products, services and technologies, is central to ensuring that investment in space has an effective impact on Angolan society. Indeed, the sustainability of space projects requires the involvement of end users, otherwise they may not achieve the intended goals. The foregoing will create a virtuous circle in which the use of space technologies and services promotes investment in space, which in turn instead, it promotes the use of space technologies, services, and so on.

Finally, it is important to note that all space projects that are implemented and developed in Angola should take into account the training and knowledge transfer needs of the Angolan resources. This is what currently happens with the ANGOSAT project (which has multisectoral elements in the field of technology transfer and specialized skills creation) and what should also be reflected in all other projects in the space sector (namely when in collaboration with foreign entities).

Likewise, it must be ensured that the knowledge and experience obtained in training or projects abroad are duly used by the country, namely through accompanying programs for the sharing and application of knowledge and experience with the resources that participate in spatial structuring projects in Angola.

2. TRAINING AND PROMOTION		
STRATEGIES	ACTION LINES	EXPECTED RESULTS
2.4. National space training and certification program	2.4.1. Creation of an infrastructure for the permanent availability of information on space matters, including on space projects, financing, public and private entities in the space sector, among others	<ul style="list-style-type: none"> • Transparency regarding Angolan space activities • Security and predictability about space projects in Angola • Creating awareness amongst the Angolan population in order to invest in space • Angolan population supporting space activities, resulting in the promotion of unity and social peace
	2.4.2. Regular events and initiatives to publicize Angolan space activities	
	2.4.3. Promotion of campaigns, visits and activities in schools and technological centres and in the space sector	
	2.4.4. Disclosure of the advantages of using space resources, images, services and products	
	2.4.5. Creation of exhibitions and museums dedicated to the space sector	

Table 22 Axis 2 Disclosure strategy

This orientation of the Angolan Space Strategy aims to ensure that Angolan space activities are permanently disclosed to the Angolan population, thus ensuring the existence of a channel to structure the information in this domain, as well as the regular realization of initiatives in this context.

The Executive believes, moreover, that a broad work should be carried out to raise awareness of importance of space use and exploration for the social and economic development of Angola, thus enhancing the participation of civil society in space programs and projects.

3. INDUSTRY AND TECHNOLOGY		
STRATEGIES	ACTION LINES	EXPECTED RESULTS
3.1. National space industry program	3.1.1. Registration of Angolan companies active in the space, technological and scientific sector	<ul style="list-style-type: none"> • Strong and competitive space industry
	3.1.2. Survey of foreign companies that supply space products and services (or that use space) in Angola	<ul style="list-style-type: none"> • State recourse to Angolan technological companies in the scope of the country's space activities
	3.1.3. Selection of strategic areas for space investment in Angola (types of products and services)	<ul style="list-style-type: none"> • Participation of private agents in the country's socio-economic development process through space
	3.1.4. Definition of investment plan and development of private initiative in Angola in selected strategic space sectors	<ul style="list-style-type: none"> • Export Angolan space products capacity and services
	3.1.5. Promotion of the development of incubation centres in the space sector and technology transfer	<ul style="list-style-type: none"> • High-value jobs
3.2. Support for the private space sector	3.2.1. Defining models to support the space sector, including studying the feasibility of creating funds and aid to finance space activity	<ul style="list-style-type: none"> • Strong and competitive space industry
	3.2.2. Feasibility study for implementing tax benefits for space activities	<ul style="list-style-type: none"> • Diversification of the economy through private activity in technological and scientific sectors
	3.2.3. Promotion of public-private partnerships in the space sector	<ul style="list-style-type: none"> • Participation of private agents in the country's socio-economic development process through space

Table 23 Axis 3 Industrial and private development strategies

This orientation of the Space Strategy aims to promote private space initiative in Angola.

Private industry has been playing an increasing role in the space sector at international cooperation, often in collaboration with States, and encourage the development of a robust and competitive industry, the industry is highly part of its activity in government contracts.

This Axis is long developed in the Angolan legislation on space: namely the Executive Decree No. 183/14 points out that the Management Office is responsible for “*planning and implement programs and projects related to science, technology and space industry*”, “*to ensure the promotion of the*

national space manufacturing industry " and " support in promoting and creation of business incubators in the space industry and their suppliers ”.

In this state of affairs, the Executive have confidence that it is essential to carry out a detailed study on the conditions for the development of the Angolan space industry and the measures that can be adopted for this purpose. Right from the start, it is essential to select the strategic areas in which Angola should invest and the development it should promote, which will also have an impact on the strategic axis relating to space infrastructure. At this point, the Executive believes that it is essential to ensure that the industry is committed to all stages of the development of space projects, from design to construction of complete space equipment and systems.

On the other hand, investment in space technology (applications and final equipment) will also play a relevant role in creating and maintaining a stable and competitive sector, while allowing the benefits of space to reach users.

The Executive should also evaluate measures to encourage private space activity, such as by reducing market risk (initiation of research & development programs) development, grant allocation) and promoting increased return on investment (such as tax benefits for high-risk activities and award of contracts to national companies). In this respect, the importance of using the purchasing power of the State to mobilize industry in the space sector.

It is also important to highlight the importance of public-private partnerships, which, in addition constitute an important source of funding for space activities, they are also an important relevant way of promoting activity in space. In this regard, it is recalled that the National Development Plan Indicates the development of partnerships as a strategic priority for public-private sectors, indicating that priority sectors should be defined for them.

In summary, the Republic of Angola's investment in the space sector will play an essential role for the development of a solid and competitive space industry, which may, in the future, contribute to the continued development of the Angolan space sector; - creating a new virtuous circle in which the public and private sectors feed each other and grow parallel in the space domain, each constituting the cause and effect of the growth of the other.

3. INDUSTRY AND TECHNOLOGY		
STRATEGIES	ACTION LINES	EXPECTED RESULTS
3.3. Clear and predictable regulatory framework	3.3.1. Studying the law relevant to the space sector (such as intellectual property, tax, among others) 3.3.2. Analysis of current legislation and assessment of the need for revision with a view to promoting space activity	<ul style="list-style-type: none"> • Clear, predictable and stable legal and regulatory framework • Attractiveness of the Republic of Angola for the pursuit of

3. INDUSTRY AND TECHNOLOGY

STRATEGIES	ACTION LINES	EXPECTED RESULTS
	3.3.3. Approval of legislation relevant to the space sector, in particular with regard to laws on space activities, registration of space objects, licensing of radiocommunication stations and commercialization of satellite images	<p>space activities</p> <ul style="list-style-type: none"> • Increase in foreign investment in Angola • Increased revenue from the development of the space industry
3.4. Standardization and certification of Space products and services	<p>3.4.1. Survey of the main standards applicable in the space sector</p> <p>3.4.2. Definition of the conditions for compliance with the standards selected by the national industry</p> <p>3.4.3. Evaluation of the creation of criteria and certification entities for space products and services</p>	<ul style="list-style-type: none"> • Clear, predictable and stable standardization framework • Coordination and compatibility with standards adopted at international level • Ability to create exportable products and services • Strong and competitive space industry

Table 24 Regulatory and standardization strategies

The creation of a complete and clear legal and regulatory framework is fundamental to promote private space activities.

From the outset, the Executive believes that it is important to pass legislation on space activities that reflect the international obligations of the State contained in the Space Treaties of the United Nations¹. It should be remembered, moreover, that United Nations General Assembly Resolution No. 59/115 of December 10, 2004 recommends that States pursue space activities that approve and implement national laws that authorize and provide for the supervision of activities non-governmental entities under its jurisdiction. The approval of national legislation will guarantee the following:

- Knowledge and monitoring by the State, the space activities carried out in its territory or by its citizens/entities;
- The protection of the State's political and strategic interests, ensuring that private activities companies do not meet these goals;

¹ The Treaty on Principles Governing the Activities of States in the Exploration and Use of Ultraterrestrial Space, Including the Moon and Other Celestial Bodies (“OST”), the Treaty on the Rescue of Astronauts, the Return of Astronauts and the Return of Launched Objects to the Ultraterrestrial Space (“Rescue Agreement”), The Convention on International Liability for Damage caused by Space Objects (“Liability Convention”), The Convention on the Registration of Objects Launched into Ultraterrestrial Space (“Registration Convention”) And the Agreement that regulates the Activities of States on the Moon and other Celestial Bodies (“Moon Agreement”).

- The accountability of private entities for their spatial activity to the extent that the State is held accountable internationally;
- The security, coherence and predictability of space activities.

The subject of the licensing of radio communication stations (given that satellites in orbit must communicate with ground stations) must also be addressed. In fact, the approval of the government for licensing of terrestrial stations is a requirement of article 78 of the General Regulation of Electronic Communications (approved by Presidential Decree No. 225/11, of 15 August).

Another relevant point concerns the production, acquisition, commercialization and distribution of images of satellite. The regulation of this activity tends to focus on two aspects: satellite (in practice, the collection of satellite images) and the use of the data collected (in practice, the dissemination/commercialization), with a view of protecting sensitive information and creating for high resolution images.

The legislation to be passed in this regard should take due account of the various challenges that the collection and processing of satellite data may pose - such as privacy and national security, intellectual property, responsibility (accuracy and completeness of data), as well as priority access by the State to images.

Finally, it will also be important to assess whether it is necessary to revisit other legal norms with a view to encourage space activities (e.g.: in tax and customs matters, or in terms of government procurement that promotes and facilitates the purchase of materials and critical services for the country).

The theme of standardization is also very relevant due to the need to harmonize the space infrastructures and applications and ensure their interoperability and integration data, as well as the quality, safety and suitability of space products.

4. INTERNATIONAL POSITION		
STRATEGIES	ACTION LINES	EXPECTED RESULTS
4.1. Position of the Republic of Angola in the United Nations, namely in the areas and initiatives dealing with the space sector	4.1.1. Identification of key United Nations initiatives and working groups in the space sector, including at regional level 4.1.2. Selection of initiatives and groups in the space sector in which Angola intends to participate 4.1.3. Determination of the Space Treaties to which Angola intends to adhere 4.1.4. Angola's participation in United Nations initiatives and projects, as well as adherence to the selected Space Treaties	<ul style="list-style-type: none"> • Strengthening the international position of the Republic of Angola • Angola's contribution to the definition of international measures and strategies in the space sector, for the benefit of the country • Greater prestige and influence of Angola in the international

4. INTERNATIONAL POSITION		
STRATEGIES	ACTION LINES	EXPECTED RESULTS
		context.

Table 25 Axis 4 Positioning strategy at the United Nations

The Executive believes that, in order to reinforce Angola's position in the international context, the country is expected to become part of COPUOS. As a member of COPUOS, Angola will be able to contribute for international space discussions and decisions, get in touch with various international players in the space field and strengthen their presence in the international context. Additionally, by participating in COPUOS working groups to be selected, Angola will contribute to the definition of international policies and ensure that they respect Angola's needs and interests.

The Executive believes that Angola should adhere to and ratify the Space Treaties, namely the “OST”, the “*Registration Convention*”, The “*Liability Convention*” in the “*Rescue Agreement*”.

Additionally, other United Nations initiatives in which Angola should participate, such as:

- The CD (“Conference on Disarmament”) - which will make it possible to strengthen the country's international role and ensure her participation in international discussions on disarmament;
- The General Assembly Group of Government Experts on TCBMs (“Transparency and Confidence Building Measures”) For Space Activities - which will allow Angola to participate in discussions on the transparent use of ultra-terrestrial space;
- The UN-SPIDER program (“UN Platform for Space-Based Information for Disaster Management and Emergency Response”) - which will allow Angola to benefit from this program and, in the future, contribute to it;
- COPUOS regional centres for space science and technology education (of which there are two in Africa - Morocco and Nigeria).

4. INTERNATIONAL POSITIONING		
STRATEGIES	ACTION LINES	EXPECTED RESULTS
4.2. Position of the Republic of Angola in the African Union in space matters	4.2.1. Checking the status of work in the African Union on the implementation of African space policy and strategy 4.2.2. Angola's active participation in ongoing work with an impact on the space sector 4.2.3. Study of initiatives and projects that Angola can launch in the African Union as joint projects with other African countries	<ul style="list-style-type: none"> • Strengthening the regional positioning of the Republic of Angola • Defining regional spatial goals and measures that are beneficial to Angola

Table 26 Axis 4 African Union positioning strategy

Taking into account the African Union's position on space, the Executive trusts that the Republic of Angola should actively intervene in projects that the African Union launches or may launch, particularly in pursuit of the goals of its Space Policy and Strategy, with a view to with to strengthening Angola's international role in this area and ensuring that decisions that taken at the regional level are in line with the country's goals and concerns.

4. INTERNATIONAL POSITIONING		
STRATEGIES	ACTION LINES	EXPECTED RESULTS
4.3. Angola's participation in supranational organizations, projects and initiatives	4.3.1. Survey of the main international organizations, projects and initiatives in the space sector	<ul style="list-style-type: none"> • Increase and diversification of space projects
	4.3.2. Selection of work areas in which Angola intends to participate	<ul style="list-style-type: none"> • Cost reduction through participation in joint projects with other entities
	4.3.3. Angola's adhesion to space organizations, projects and initiatives	<ul style="list-style-type: none"> • Obtaining knowledge and experience through a practical approach to space projects
4.4. Bilateral and multilateral partnerships	4.4.1. Survey of States/entities with spatial activity relevant to Angola	<ul style="list-style-type: none"> • Carrying out joint space projects with other countries
	4.4.2. Selection of areas in which Angola intends to launch collaborative projects or requires foreign assistance	<ul style="list-style-type: none"> • Cost reduction through participation in joint projects with other entities
	4.4.3. Conclusion of bilateral and multilateral partnerships with the selected States/entities in the relevant areas	<ul style="list-style-type: none"> • Obtaining knowledge and experience through a practical approach to space projects

Table 27 Axis 4 Strategies for participation in international initiatives and partnerships

Cooperation with space/technological entities and agents has been considered fundamental instrument to the development of the space sector, first of all because it is recognized that, usually, a single country does not have the capacity to support an ambitious space program at acceptable costs without participating in international cooperation activities.

In this situation, the Executive Decree No. 183/14 indicates that it is the responsibility of the Management “*establish cooperation protocols with technical and scientific institutions in the field space*”, Which also requires partnerships and agreements with foreign entities.

The Executive therefore considers that international bodies and initiatives should be selected within the country can work and collaborate in different sectors, including, training and awareness, as well as in the field of communications, remote sensing, navigation and positioning.

Investment in bilateral and/or multilateral partnerships is also recommended as cooperation with other states and agencies brings a variety of benefits, such as sharing costs and risks, the possibility of sharing knowledge and expertise and making contacts in the international context.

International cooperation will require the selection of areas of cooperation (which should include professional training and joint space projects with a view to technology transfer) and determine the main countries and agencies for this purpose. The executive considers that they should include not only States with a level of spatial development more advanced and that can therefore contribute to the spatial progress of Angola, but also countries with a relevant presence in space, although without the same degree of autonomy and independence - thus ensuring a higher degree of contribution and leadership from Angola in international projects, structuring and mobilizing. The partnerships to be implemented should ensure benefits, socioeconomic conditions for the country and strengthen Angolan space assets.

Additionally, given that the Republic of Angola is a member of CEEAC and SADC, the Executive recommends that the country evaluate participating in projects that require the use of space technologies, therefore enhancing the use of Angolan products and services in this context.

5. ORGANIZATION AND COOPERATION		
STRATEGIES	LINES OF ACTION	EXPECTED RESULTS
5.1. Angolan spatial institutional structure	5.1.1. Survey of current entities with competences in the space sector or in parallel sectors, as well as that use space data, products and services 5.1.2. Definition of the Angolan spatial organic structure, including the following: <ul style="list-style-type: none"> • The Angolan space agency • The National Centre for the Capturing and Processing of Satellite Images in Angola² • INACOM³ • INFRASAT 5.1.3. Approval of the creation of entities (if applicable), attributions, financing and supervision	<ul style="list-style-type: none"> • Competent specialized entities in the space sector • Centralization and convergence of assignments in spatial matters in a structured ecosystem that avoids the dispersion of efforts • Greater capacity for internal and international action in space matters • Strengthening Angola's international positioning through specialized agencies and entities

Table 28 Axis 5 Spatial organic structure strategy

The Interministerial Commission for the General Coordination of the National Space Program and the Office Management are currently existing entities with competences in space matters. The Executive believes that it is necessary to create an additional institutional structure that is responsible for the execution of Angolan space measures and activities, thus guaranteeing their greater efficiency and efficacy.

The Interministerial Commission should maintain the definition of the main axes strategic issues in space, as well as in relation to specific projects and programs that will be approved.

To the space agency (which the Executive believes should result from the conversion of the Management) it will be up to the execution of the present Space Strategy and the space missions of the State. It will be the agency responsibility also for licensing and monitoring private space activities, as well as registration of spatial objects (being the COPUOS interlocutor in this field). The space agency should be under the tutelage of the Interministerial Commission and have the ability to pursue projects either civilian and military in coordination with the competent entities in each sector of activity - thus responding more effectively to the “dual-use” character of space technology and contributing to the creation of synergies between the different sectors.

² The National Centre for Capturing and Processing of Satellite Images of Angola is a scientific institution under the supervision of the Ministry of Science and Technology in charge of promoting the capturing, monitoring and processing of satellite images to support scientific and technological activities.

³ INACOM is the regulatory body for electronic communications, whose Organic Statute was approved by Presidential Decree No. 243/14, of 9 September. INACOM is a public institute subject to the supervision of MTTI and responsible for regulating, supervising and inspecting electronic communications and postal services, as well as ensuring the management and supervision of the radio frequency spectrum and orbital positions.

Angola's National Centre for Satellite Image Capturing and Processing should assume central functions of obtaining and distributing satellite images within the public administration, as well as making them available to the public according to conditions to be defined. The Centre should constitute the central repository of satellite information to be used by the State, as well as how to allow access to data by the public and private companies for their business conditions that ensure its effective use.

Additionally, the Executive believes that it is essential to proceed with the restructuring of INFRASAT, making it an autonomous company with a focus on satellite communications – and thus contributing to better management and consequent development of this area in Angola. In this situation, and in general, the Executive considers that the success of the Space Strategy also depends largely from an active and dynamic public business sector in structuring domains, namely satellite communications/networks.

5. ORGANIZATION AND COOPERATION		
STRATEGIES	ACTION LINE	EXPECTED RESULT
5.2. Sectorial plans for the use of space resources, images, products and services	5.2.1. Approval of plans for the development and use of space products and services in each relevant sector in Angola, including the following strategic sectors: <ul style="list-style-type: none"> • Communications and IT • Education (distance training and access to educational content) • Science and technology (scientific research) • Environment and meteorology/disaster response (climate monitoring, forecasting and fighting natural disasters) • Natural resources (geological survey, resource management) • Defence and security (border control, airspace and mine clearance, traffic management) 5.2.2. Central determination, by the responsible entity in the space sector, of the main aspects to be included in the sectoral plans (e.g.: training, creation of specific space units, etc.)	<ul style="list-style-type: none"> • Effective use of the benefits of using space in all sectors of activity • Contribution of competent entities from different sectors of activity in the definition and implementation of the country's spatial goals

Table 29 Axis 5 Strategy for the sectorial use of space technologies

The elaboration of sectorial space strategies or the integration of space activities in plans sectors will ensure that space is used to the full benefit of Angolan society, accordingly recognizing the strategic and multisectoral character of space activities.

The communications sector already addresses, for most of its strategic plans, the issue of use of space and the ANGOSAT project, therefore it is necessary to ensure that the other sectors also address this

issue, with a view to the construction of a complete and transversal space building. Thus, space technologies should be integrated into other public policies in execution and the one to be written.

For example, in the area of disaster response, the systematic use of satellite data will largely contribute to the implementation of civil protection policy, disasters risk management plans and the exercise of the powers of the competent bodies in this matter (National Council Civil Protection, National Commission for Civil Protection and its members).

5. ORGANIZATION AND COOPERATION		
STRATEGIES	ACTION LINES	EXPECTED RESULTS
5.3. Cooperation and information sharing	5.3.1. Definition of a transversal strategy for the use of resources, images, services and space products by public entities 5.3.2. Implementation of cooperation and information sharing instruments	<ul style="list-style-type: none"> • Harmonization of the processes and activities of public entities in the use of resources, images, services and space products • Cost reduction • Increased efficiency and effectiveness of public activity

Table 30 Axis 5 Spatial organic structure strategy

Cooperation between various Angolan institutes, agencies, services and bodies is very relevant for guarantee not only the development of space activities in Angola, but above all to guarantee the coherence, coordination and sustainability of the Angolan space sector.

In this context, cooperation between all the ministries that make up the Interministerial Commission for the General Coordination of the PEN, as well as among the ministries (and entities under their tutelage) responsible for the strategic areas for Angola, is decisive for the success of this Strategy. It is these agents who will have to be called upon to collaborate and intervene in space matters in Angola, either for its contribution to the development of space activities, or for the relevance that space activities will have in the performance of their duties.

Cooperation between these entities will boost not only Angolan space activities, how it will guarantee the effective use of the benefits that space can bring

II.5. NATIONAL SPACE PROGRAM

This Space Strategy establishes the Strategic Axes and main measures that must be pursued for the development of the space sector in Angola and the general promotion and sectoral goals of the State through the use of space.

The execution of the referred goals also requires the definition and execution of programs and short- and medium-term space projects, thus responding to the requirement for approval of Motor Projects indicated in the ICT White Paper. The Executive believes that it will be up to the Interministerial Commission to proceed with the regular definition of these Online Motor Projects with the Axes of this Space Strategy, and to the competent entities in the space sector (namely the space agency) in order to carry out its implementation.

The Executive already indicated priority structural projects that should constitute the content of the first National Space Program:

1. Space infrastructure project with the launching of the ANGOSAT 1 satellite, expansion and development of the terrestrial telecommunications segment with an impact direct on digital terrestrial television;
2. Human resources training project, namely through the construction, implantation and development of the National Centre for Space Studies, with a direct impact on promoting technology transfer and industrial incubation; and
3. Implementation of an Angolan spatial institutional structure, namely through the creation and implementation of the Angolan space agency.

II.6. FINANCING

Financing is an indispensable element in ensuring the implementation of this Space Strategy. It is therefore essential to invest in the allocation of financial resources significant and stable in the short-medium and long-term, with well identified sources of funds. This allocation must take into account the Axes and strategies contained in this document, as well as the needs for each specific program and project that may be approved under the terms analysed above.

It is important to start by recalling that several projects of the National Space Strategy already benefited from the state budget, as is the case with the ANGOSAT project and human resources capacity building, including through the constitution from the Angolan Centre for Space Studies.

Without prejudice to financing as stated above, as well as by public-private partnerships the Executive believes that self-sustaining the National Space Strategy must be guaranteed and each of its Programs.

The revenues obtained from space activities and technologies, namely the availability of surplus capacity from ANGOSAT (and future communications satellite) to the private sector and neighbouring countries, as well as the marketing of satellite images and, in the medium-and long-term, the

exploration of orbital positions, should constitute privileged sources of financing for the National Space Strategy and Programs.

In this regard, the Executive believes that a feasibility study should be carried out, financial support for the Space Strategy through the models indicated, additionally should be assessed and decided the degree of allocation of the revenues thus obtained for the national space projects (taking into account, inter alia, the fact that these revenues may come from different entities - from the outset, the commercialization of satellite images the National Centre for Satellite Image Capture and Processing while the revenues from the exploration of orbital positions belonging to INACOM).

The feasibility study should be carried out during 2016, considering the Executive Committee which will be responsible for the Interministerial Commission to take the relevant terms of financing the Space Strategy and Programs.

III. IMPLEMENTATION OF THE SPACE STRATEGY

3. Industry and technology	3.1. Support for the private space sector	████████		
	3.2. Support for the private space sector	██		
	3.3. Clear and predictable regulatory framework	██████████		
	3.4. Standardization and certification of space products and services	██████████		
4. International positioning	4.1. Position of the Republic of Angola at the United Nations	██		
	4.2. Position of the Republic of Angola in the African Union in space matters	██		
	4.3. Angola's participation in international organizations, projects and initiatives	██		
	4.4. Bilateral and multilateral partnerships	██		
5. Organization and cooperation	5.1. Angolan spatial institutional structure	██████████		
	5.2. Sectoral plans for the use of space resources, images, products and services	██████████		
	5.3. Cooperation and information sharing	██		

Table 31 Timetable for implementing the Space Strategy

The execution of each strategy should be measured using a set of indicators, among the following:

Axis	Strategies	Indicators
1. Spatial infrastructure	1.1. Communications satellite ANGOSAT 1 and future satellites	<ul style="list-style-type: none"> • Number of operational communications satellites • Degree of use of satellites • Customers (national and/or foreign) of the satellite capacity
	1.2. National satellite communications system	<ul style="list-style-type: none"> • Terrestrial segment extension • Network quality levels • Degree of national use
	1.3. Earth Observation Program	<ul style="list-style-type: none"> • Approved program
	1.4. Remote sensing satellites (Earth observation and /or meteorology) and/or ground receiving stations	<ul style="list-style-type: none"> • Number of operational satellites and ground stations • Degree of use of satellites • Customers (national and/or foreign) of satellite images
	1.5. Geographic information system (GIS)	<ul style="list-style-type: none"> • Centralized geographic information system • Degree of use of the public and private sector
	1.6. Exploration program for orbital	<ul style="list-style-type: none"> • Number of orbital positions used

Axis	Strategies	Indicators
	positions	<ul style="list-style-type: none"> Revenues from the exploration of Angolan orbital positions
	1.7. Program for the development of, and/or participation in, satellite positioning and navigation systems	<ul style="list-style-type: none"> Number of navigation and positioning projects involving Angola Degree of use of navigation and positioning products and services
	1.8. Program of autonomy of the Angolan State in access to space	<ul style="list-style-type: none"> Launching vehicles produced in Angola Launching centre in Angola or Number of stable partnerships in this field
2. Training and promotion	2.1. National space training and certification program	<ul style="list-style-type: none"> Number of experts in space areas Number of centres and institutes trained in space Number of partnerships with foreign entities and the private sector Number of patented inventions
	2.2. Angolan Centre for Space Studies	<ul style="list-style-type: none"> Installed and operational centre
	2.3. Promotion of the use of space resources, services and products in the public and private sector	<ul style="list-style-type: none"> Number of trained users Degree of use of resources, services and space products in Angola
	2.4. Program for the dissemination of space activities	<ul style="list-style-type: none"> Disclosure system implemented Number of initiatives and campaigns carried out
3. Industry and technology	3.1. National Space Industrial Program	<ul style="list-style-type: none"> Approved program Number of companies in the space sector Number of exports in the space sector Number of space projects Number of professionals working in space/jobs
	3.2. Support for the private space sector	<ul style="list-style-type: none"> Number of companies in the space sector Number of space projects, applications, products and services Number of products and services protected by intellectual property ROI
	3.3. Clear and predictable regulatory framework	<ul style="list-style-type: none"> Legislation and regulations approved Number of private space companies and initiatives in Angola
	3.4. Standardization and certification of space products and services	<ul style="list-style-type: none"> Approved standards Number of certified products Number of exports
4. International position	4.1. Position of the Republic of Angola at the United Nations	<ul style="list-style-type: none"> Participation in COPUOS, CD and ITU in space matters Number, and degree of participation of Angola, in initiatives and working groups
	4.2. Position of the Republic of Angola in the African Union in space matters	<ul style="list-style-type: none"> Number, and degree of participation of Angola, in initiatives and working groups

Axis	Strategies	Indicators
	4.3. Angola's participation in international organizations, projects and initiatives	<ul style="list-style-type: none"> • Number of projects participated by Angola • Impact on training and development in Angola
	4.4. Bilateral and multilateral partnerships	<ul style="list-style-type: none"> • Number of completed partnerships • Impact on training and development in Angola
5.Organization and cooperation	5.1. Angolan spatial institutional structure	<ul style="list-style-type: none"> • Created and operational bodies
	5.2. Sectorial plans for the use of space resources, images, products and services	<ul style="list-style-type: none"> • Approved plans • Degree of use of space products and services
	5.3. Cooperation and information sharing	<ul style="list-style-type: none"> • Information sharing instruments implemented • Degree of cooperation and information sharing

Table 32 Execution indicators for each Strategy

III.2. GOVERNMENT MODEL

The implementation of the Space Strategy should be monitored through a structure that ensures:

- Coordination by the Interministerial Commission of national space activities, as well as how to follow up and monitor them;
- The active involvement of the ministries that make up the Interministerial Commission, as well as other relevant ministries, agencies and bodies;
- Multisectoral articulation between all agents involved;
- Mobilization of the private sector and civil society.

For this purpose, an organizational structure must be created according to the following diagram:

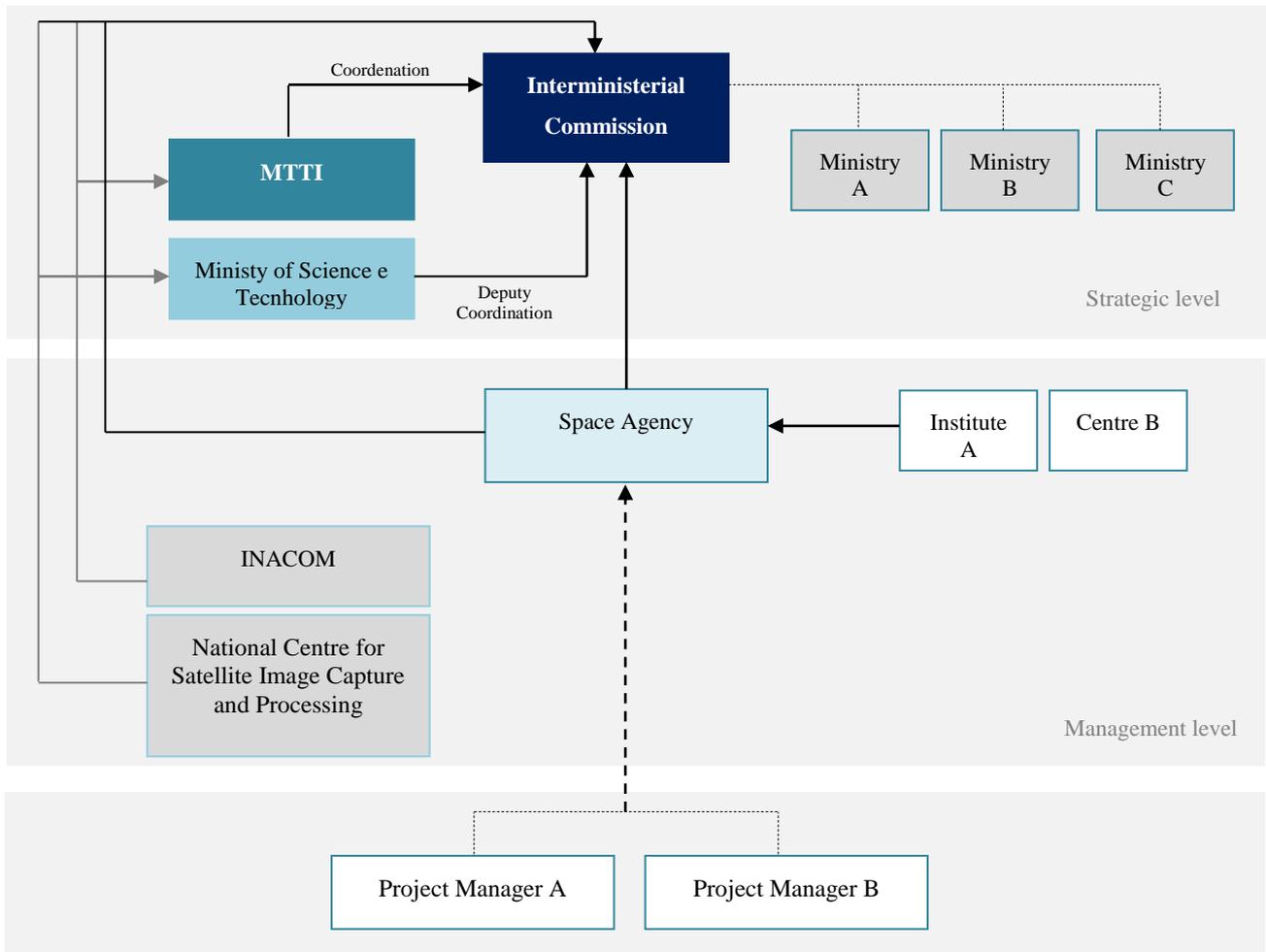


Table 33 Spatial organic structure (diagram)

The table below indicates the main competences of the central strategic bodies for the Space Strategy:

Organ	Level of governance			Responsibilities
	E	G	O	
Interministerial Commission	√			<ul style="list-style-type: none"> Define Angola's spatial strategic guidelines Define priorities according to the country's development goals Coordinate Angolan space activities Track and monitor space activities Audit and regularly monitor compliance with the Space Strategy Report on the implementation of the Space Strategy at ministerial and supraministerial level Perform the duties indicated in Presidential Order No. 101/13, of 9 October

Space Agency	√	<ul style="list-style-type: none"> • Define, manage and execute space projects and programs • Coordinate and align goals and actions between different sectors • Articulate the operationalization of space activities with public and private entities involved • Monitor compliance with project goals and targets • Report the execution of space activities to the Interministerial Commission
INACOM	√	<ul style="list-style-type: none"> • Manage and assign orbital positions according to rules to be defined • Report its activity in this field to the Interministerial Commission
Satellite Imaging Centre	√	<ul style="list-style-type: none"> • Obtaining, processing and making available satellite images in the public sector and for end users • Define rules and procedures for the use of satellite images • Report its activity in this field to the Interministerial Commission
Project managers	√	<ul style="list-style-type: none"> • Identify and detail the scope, goals, restrictions, deliverables, deadlines for each project and space program • Control and monitor compliance with them • Report its execution to the space agency

Table 34 Responsibilities of each entity in the space sector

It is the Executive's understanding that the implementation of this Space Strategy will contribute for Angola to continue the path of autonomy, independence and technical prestige, economic and international status of the country.

The sustained construction of the Angolan space activity will allow, in the medium to long-term, transform the Republic of Angola from a user/consumer of services, products and space technology, to an operator and producer of services, products and space technology.

This repositioning of Angola will have profound repercussions not only on the role of Angola as a space agent, but also in its role on all government intervention fronts: the development of space activity will create a cascade effect that will benefit all Angolan sectors and that will spread throughout all areas of the country's social, economic, political, commercial and industrial policy. It will also reinforce the role of leadership, innovation and pioneering spirit of the Angolan State.

From space, Angola will design her role on Earth. And, from space, Angola will become unavoidable and decisive for the agents and countries of the Earth.

ATTACHEMENT

GLOSSARY

CD	Conference on Disarmament
CEEAC	Economic Community of Central African States
COPUOS	Committee on the Peaceful Use of Ultra-terrestrial Space (“Committee on the Peaceful Uses of Outer Space”) (United Nations)
GIS	Geographic Information System (“Geographic Information System”)
IGCA	Geographical and Register Institute of Angola
INACOM	National Communications Institute (Angola)
“Liability Convention”	Convention on International Liability for Damages caused by Space Objects
“Moon Agreement “	Agreement that regulates the Activities of States on the Moon and other Celestial Bodies
MTTI	Ministry of Telecommunications and Information Technologies (Angola)
OST	Treaty on the Principles Governing the Activities of States in the Exploration and Use of Ultra-terrestrial Space, including the Moon and others Celestial Bodies (“Outer Space Treaty”)
PEN	National Space Program (Angola)
PND	National Development Plan 2013-2017 (Angola)
“Registration Convention”	Convention on the Registration of Objects Launched into Space Ultra-terrestrial
“Rescue Agreement”	Treaty on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Thrown to the Ultra-terrestrial Space
SADC	Southern African Development Community (“Southern African Development Community “)
TCBMs	“Transparency and Confidence Building Measures”
UA	African Union
UIT	International Communications Union
UN-SPIDER	“UN Platform for Space-Based Information for Disaster Management and Emergency Response”