NATIONAL SPACE POLICY

EXECUTIVE SUMMARY

1. PREAMBLE:

Over the years, mankind has benefited from the advances in space technology in diverse areas such as satellite communication, remote sensing and meteorology among others. The benefits have however accrued to us mostly indirectly as consumers of products and services engineered and provided either by multi-lateral companies or intergovernmental agencies such as INTELSAT, INMARSAT, RASCOM, COPUOS, etc. Nigeria is also a participant in the multilateral centre for Space Science and Technology Education in Africa.

While some of these products and services have helped to serve the social and economic needs of the country, Nigeria presently cannot claim to possess the technical know-how to participate actively and independently in space related activities as a service provider. It has thereby remained a nation of consumers of space-derived products.

There is no nation that can call itself developed in the 21st century that does not have **indigenous critical mass of trained space scientists and engineers** who contribute actively to the solution of the nation's problems. Such critical mass can only be acquired through a well-defined and developed country space programme.
It is, therefore, self evident that the scientific and technological development of Nigeria as a people and a nation will be partly anchored on its commitment to continuously master, develop and utilise the by-products of space technology to address her diverse socio-economic problems.
The Policy Document and Programme attached herein are definitive and authoritative statements, roadmaps and signposts that, if faithfully followed, will transform Nigeria from the status of a consumer nation to an active participant in space technology and allied fields within three years.

2. Vision Statement

To make Nigeria build indigenous competence in developing, designing and building appropriate hardware and software in space technology as an

essential tool for its Socio-Economic development and enhancement of the quality of life of its people.

3. Mission Statement.

To use these capabilities as a tool for:

(i) Developing and Managing our Agricultural and Forestry Resources through establishment of database for project planning, crop performance assessment, yield production for sustainable food production thereby assuring food security.

(ii) Assessment and Management of our National Resources, (air, land minerals and water) such as oil exploration, exploitation and management, assessment of the quality and quantity of both surface and under ground water and monitoring of marine water.

(iii) Development of an effective and efficient communication system

(iv) Enhancement of our transportation and tourism enterprises.

(v) Development of our Education and health care delivery systems both rural and urban.

(vi) Development and management of our Energy Resources.

(vii) Human safety and Mitigation of disasters.

(viii) National Defence and Security.

4. POLICY STATEMENTS

i. Nigeria shall vigorously pursue the attainment of Space Capabilities as an essential tool for its socio-economic development and the enhancement of the quality of life of its people. The Nation shall achieve this through research, rigorous education, engineering, development, design and

manufacture of appropriate hardware and software in space technology, including transport and payloads, such as satellites, telescopes and antennas for scientific research and applications.

ii. Government shall also foster Bi-lateral and international cooperation in all aspects of space science and technology in order to ensure that Nigerian Scientists and Engineers will benefit from global developments in this enterprise.

4.1 Objectives

Government shall enhance the development of the following areas of space science and technology, which are indispensable for the achievement of the policy statements:

(a) **Basic Space Science and Technology** which is the understanding of how the universe works and its impact on our world. This study will enable us to lay the foundation for deriving maximum benefits from the nation's participation in the space enterprise.

(b) **Remote Sensing** which involves the understanding and management of our environment and natural resources using space-acquired information. This technology will enable us to understand our land, air and water resources and problems associated with these

(c) **Satellite Meteorology**, which in the study of atmospheric and weather sciences using satellite data to facilitate the effective management of our environment.

(d) **Communication and Information Technology**, which is the provision of efficient and reliable telecommunication services for Nigeria in order to enhance the growth of the industrial, commercial and administrative sectors of the economy.

(e) **Defence and Security**

Government shall develop necessary SST programme that will address the national needs of Nigeria. For this purpose government shall establish a Defence Space Command in the Ministry of Defence. The Command shall comprise representatives of the Defence, intelligence, security and law enforcement services and report through the Ministry of Defence to the National Space Council.

4.2 Institutional Frame Work.

Space Technology is multi-disciplinary, therefore it is necessary to establish centers of excellence and an institutional framework to develop the relevant fields and coordinate various programmes for the attainment of the national space capability. In order to achieve the objectives of the policies, therefore, the following activity centers shall be established by the government:

1. **Centre for Basic Space Science**
2. **Centre for Remote Sensing**
3. **Centre for Satellite Technology Development**
4. **Centre for Geodesy and Geodynamics**
5. **Centre for Space Transport & Propulsion**
6. **Centre for Space Science and Technology Education**

and any others it may deem necessary in the future.

Government shall also put in place an institutional framework that will oversee all the SST activities in the Country under an Apex Organ to be called the **National Space Council.**

4.3 Composition of Advisory Committees.

There shall be two advisory committees; Technical Advisory Committee and a Committee on International Cooperation to take care of policy statements i and ii respectively.

The composition of the two committees is spelt out in Annex one.

5. NATIONAL SPACE COUNCIL

5.1 Policy Statement

It shall be the policy of Government to establish a NATIONAL SPACE COUNCIL to be chaired by Mr. President.

5.2 Objectives

The National Space Council will be responsible for the development of the nation's policy guidelines on space activities.

5.3 Membership

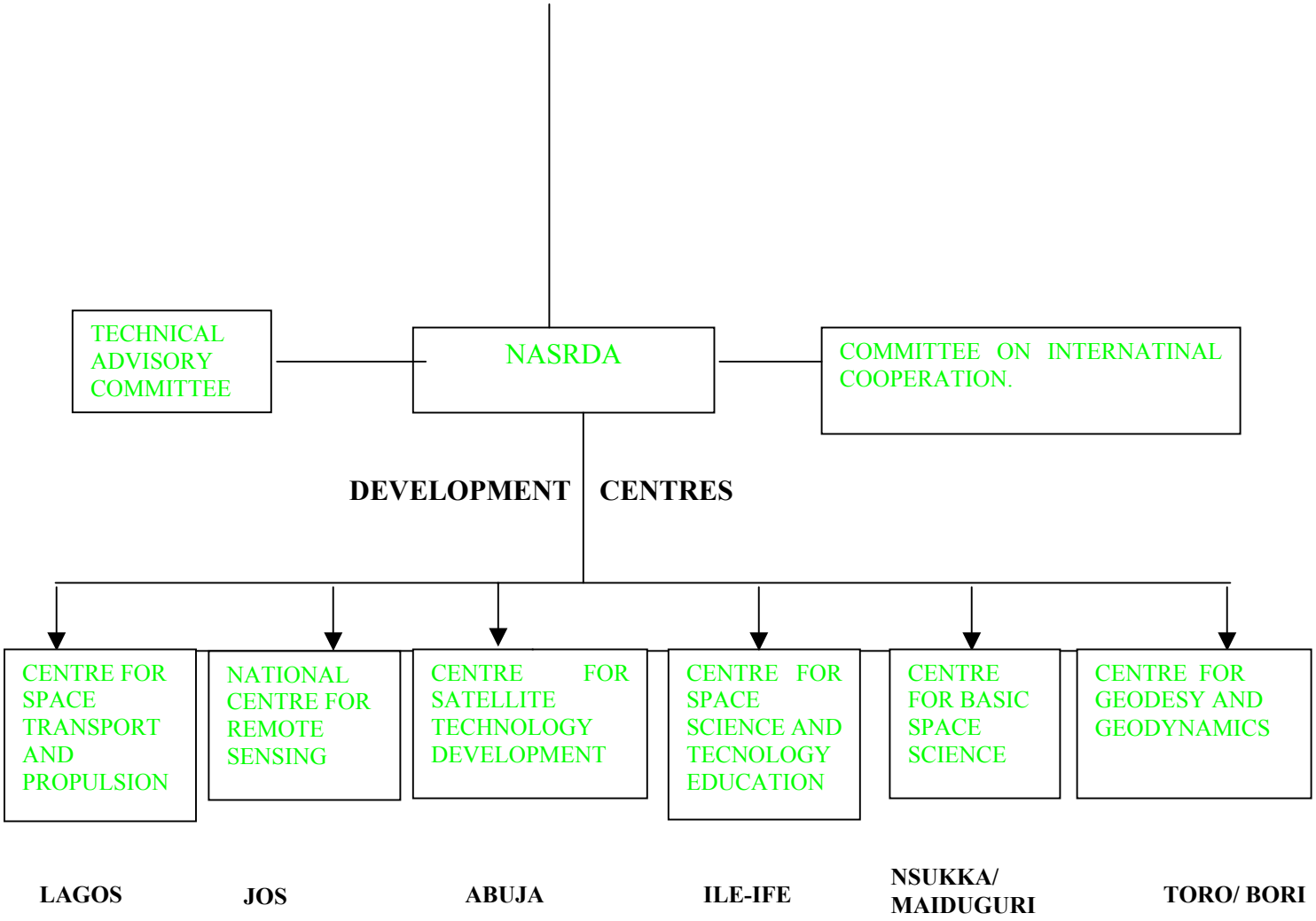
Membership of the National Space Council shall include:

(1) His Excellency, Mr. President
(2) His Excellency, Mr. Vice President
(3) National Security Adviser
(4) Minister of Defence
(5) Minister of Internal Affairs
(6) Minister of National Planning
(7) Minister of Communication
(8) Minister of Science and Technology
(9) A Private Sector representative
(10) Two distinguished scientists.

The Ministry of Science and Technology, which coordinates and supervises the activities of National Space Research and Development Agency, will provide the secretariat.

An organogram for the institutional framework for the National Space programme is shown in Figure 1 and in Annex 1.

FIGURE 1: ORGANOGRAM FOR NATIONAL SPACE PROGRAMME


TECHNICAL ADVISORY COMMITTEE
NASRDA
COMMITTEE ON INTERNATINAL COOPERATION.
DEVELOPMENT CENTRES
CENTRE FOR SPACE TRANSPORT AND PROPULSION
NATIONAL CENTRE FOR REMOTE SENSING
CENTRE FOR SATELLITE TECHNOLOGY DEVELOPMENT
CENTRE FOR SPACE SCIENCE AND TECNOLOGY EDUCATION
CENTRE FOR BASIC SPACE SCIENCE
CENTRE FOR GEODESY AND GEODYNAMICS
LAGOS
JOS
ABUJA
ILE-IFE
NSUKKA/ MAIDUGURI
TORO/ BORI

NATIONAL SPACE POLICY

APPLICATION AREAS

CHAPTER ONE

DEVELOPMENT OF HUMAN RESOURCES AND CAPACITY BUILDING

1.1 Capacity Building

The basis of sustainable development is the development of the requisite manpower within the nation's industrial, research and academic institutions.

1.2 Policy Statement

Government shall develop a "critical mass" of Nigerians in the area of space science and technology to enable the country realize its objectives for

achieving Technological, industrial, Commercial and economic self-reliance.

1.3 Objectives

(a) To develop a pool of Nigerian Engineers, Scientists and Technicians that can design, fabricate, build and manufacture hardware and software for various purposes.

(b) To develop various skills in various aspects of space science and technology

(c) To provide attractive career opportunities for the numerous brilliant Nigerian physicists, chemists, engineers, mathematicians and Environmentalists.

(d) To develop Nigerian technological products that can feed our manufacturing industries and earn-foreign exchange

(e) To develop highly trained personnel that can train the trainers in all aspects of science and technology.

1.4 Strategies

(a) Make the study of space science mandatory at all levels of education through adequate financing and provision of materials and resources

(b) Develop relevant infrastructures such as planetoria for public awareness of the universe and relevant curricula for the primary, secondary and tertiary institutions.

(c) Enhance the capabilities of the various institutions with space related disciplines such as:

(i) University of Nigeria, Nsukka

(ii) University of Lagos, Lagos

(iii) University of Ibadan, Ibadan

(iv) University of Ilorin, Ilorin

(v) Obafemi Awolowo University, Ile-Ife

(vi) Ahmadu Bello University, Zaira

(vii) Bayero University, Kano

(viii) Tafawa Balewa University, Bauchi

(ix) Federal University of Technology, Minna

(x) Rivers State Uni. of Science & Technology, Port-Harcourt

(xi) Federal University of Technology, Akure

(xii) Sheda Science and Technology Complex, Abuja

(xiii) National Mathematical Centre, Abuja

(xiv) The National Remote Sensing Centre, Jos.

(xv) Federal University of Technology, Owerri

(d) Establish facilities for distance learning via satellite technology that will bring education to all nooks and corners of our rural areas and to those citizens that cannot afford to pay for formal higher education.

(e) Create the enabling environment that can bring back many Nigerian super specialists in Diaspora.

(f) Establish special activity centres that can concentrate on specialized areas of space science and technology such as centres for satellite development, aircraft manufacturing, rockets and basic space science amongst others.

CHAPTER TWO

POVERTY ALLEVIATION AND FOOD SECURITY THROUGH MANAGEMENT OF NIGERIAN NATURAL RESOURCES

2.1. Introduction

Nigeria is the most populous African country with a current estimated population of about 100 million people, a land area of 923,770 km^2, a coastal zone of 830 km and an exclusive economic zone covering 256,000km^2 of the Atlantic ocean. The country is richly endowed and may be classified among the world's richest countries in the abundance of natural (renewable and non-renewable) resources. Yet, the country imports food, imports crude oil and imports many other things to meet the needs of her people. Space science and technology can help alleviate whatever the problems are.

2.2. Policy Statement

Government shall endeavour to use Space Technology in the area of poverty alleviation and food security, through efficient exploitation and management of the nation's natural resources.

2.3. Objectives:

The following resource assessment and management activities will benefit from space technology applications in the short- and long-term.

A. Agriculture

Crop performance assessment, yield predication, determination of remedial actions to be taken to forestall failure

B. Land Resources

- Oil exploration, exploitation management; detection of faults, lineaments and other geological features that identify oil reservoirs; mapping and monitoring of oil fields, Terrain and pipeline routes. Tracking of oil spills, spill dispersion and follow-up activities, as well as proper design of pipelines to take care of space related hazards such as the effects of solar flares and CMES mineral resources exploration and exploitation at more accurate rates, through resource assessment and management.

- Land resources and Terrain evaluation for strategic and Tactical military operations and land use planning
- Soil evaluation for suitability and capability determinations for various uses.

C. Water Resources

- Assessment of the quantity and quality of both surface and underground water, rainfall prediction, as well as the importance of integrated, water resources management on drought and other disasters forecasts, modeling the amounts and potential impacts of run off, the preparation for ameliorating measures or planning for impending disasters;
- Monitoring of marine water infusion into freshwater resources etc;
- Water quality assessments through monitoring hydrological systems and planning conservation measures.

D. Ecosystems

- Evaluation and monitoring of vegetation and land use
- Evaluation and monitoring of Aquatic ecosystems.

E. Plants

- Evaluation, monitoring and measurements of plant species in forest systems
- Determination of ornamental plants
- Determination and measuration of medicinal plants
- Assessment of aquatic plants for consumption.

F. Fauna

- Determination of fish movements and provision of information to trawlers for better yields, the assessment of areas of over

exploitation and the adoption of policy measures to mitigate negative consequences

- Inventory of domestic animals and wildlife
- Provision of information for navigation purposes on weather and channel conditions.

G. The Physical Environment

- Assessment, monitoring and conservation of air quality and atmospheric indices
- Provision of weather forecasts in the short and long-term and the provision of hazard warnings

H. Education

Imparting knowledge by transmitting teaching materials through time and space

2.4 Strategies

(i) Enhance the current institutions that are involved in remote sensing activities.

(ii) Establish a national Ground Receiving Station for reception of data from various satellites.

(iii) Build and launch Nigeria Earth Observation Satellites.

(iv) Establish various (fully equipped) laboratories in each state of the Federation for satellite data analysis.

(v) Adequately fund the various projects initiated by the National Space Research and Development Agency (NASRDA).

CHAPTER THREE:

DISASTER PREDICTION, WARNING AND MITIGATION

3.1 Introduction:

Nigeria is not located within the zones of the world that are known to be highly prone to natural disasters such as typhoons, hurricanes, cyclones, earthquakes and volcanic eruptions. However cases of floods, landslides, tidal waves, coastal erosion, sand-storms, dust-storms, locust/other insect infestations, oil spillage and other man made disasters have been recorded in the country.

The Federal Government has also demonstrated its drive to reduce the severity of these hazards by setting up a number of committees, sub-committees and councils, under the supervision of Ministries and Parastatals. For example:

- National committee on Ecological problems;
- Sub-committee on Soil Erosion and Flood Control;
- Sub-committee on General environmental problems;
- Federal Environmental Protection Agency;
- National Conservation Council;
- National Advisory Committee on Renewable Natural Resources;
- National Technical Committee on Earthquake Phenomena.

In addition, most state governments have enforced a number of conservation legislation aimed at protecting the environment. **ALL THESE NEED SPACE TECHNOLOGY TO BE EFFECTIVE.**

3.2. Policy Statement

Nigeria shall endeavour to use space technology for disaster prediction, warning and mitigation.

3.3. Objectives:

The major challenges in this aspect is to develop capacity in understanding, monitoring and measuring the following:

(i) Flooding in all ecological zones

(ii) Land-slides and soil erosion in South-eastern Nigeria and other parts of the country

(iii) Whirl winds and thunder-storms, especially in arid and semi-arid areas

(iv) Heat waves in different parts of the country

(v) Drought and Desertification in the arid and semi-arid areas of the country

(vi) Sand-storms and dust-storms

(vii) Bush Burning

(viii) Locusts and other insect infestations

(ix) Hazards from oil production activities including oil spillages in oil producing areas

(x) Waste management

(xi) Natural and Man induced radioactivity

(xii) Sea level rise from expected climate change in the coastal areas

(xiii) Earth tremors in different parts of the country

(xiv) Poorly understood unusual phenomena such as disappearing

(xv) and re-appearing of crater Lakes in the Jos and Biu Plateaux

(xvi) Effects of mining activities around the country

3.4. Strategies:

(a) Developing the integrated mission for sustainable development (IMSD) which is the collation, analysis and dissemination of all satellite derived environmental data transformed into usable information to stake holders.

(b) Setting up of enabling environments for image interpretation and extraction of usable data from satellite images and digital and analogue products.

(c) Establishment of ground receiving station and mobile receivers of data from a number of satellites for real-time monitoring and measurements of events and occurrences

(d) Development of information exchange schedules such as formulation of national disaster reduction and risk management and improved knowledge of appropriate risk monitoring methodologies

(e) Development of disaster preparedness and forecasting.

(f) Development of Emergency (disaster) response system; that is, activities to be taken immediately before and after the onset of a hazard to reduce the effects of the disaster. The information needs include: issuance of warning on identification of impending hazards and the population at risk; population and resource evaluation plans; plans for administering relief; and initial evaluation of the impact of the disaster.

(g) Development of Recovery Actions/Plans such as Plans to re-establish the community and infrastructure. The information needs for recovery include; the localisation of the population affected and their needs.

(h) Location of damaged/destroyed infrastructure and the most affected sectors and areas. Others are the identification of post-emergency projects that require financial/technical assistance.

(i) Development of reconstruction plans, whose activities are the restoration of the physical infrastructures and services damaged or destroyed in the disaster.

(j) Development of regional and international cooperation in matters related to disaster management and, for informing the international community.

The benefits to society of the use of space technology in disaster management are related to its cost effectiveness in the reduction of the impacts in both the short- and long-term.

CHAPTER FOUR

DEFENCE, NATIONAL SECURITY AND LAW ENFORCEMENT

4.1. Introduction

Satellite Space technology can be applied in Defence, National Security and Law Enforcement in the following ways:

1. Conflict prevention through pre-emptive actions such as advance communication, early warning system, remote sensing, border delineation, identification of resources and monitoring of movements of suspected perpetrators of various situations.

2. Enhancement of Regional Peace Keeping Operations. This is critical to the ability of our armed forces to protect and maintain our strategic interests.

3. Space Science and Technology is a potent weapon in the fight against crime especially the deluge of international crime that are fall-outs of globalization and it plays a crucial role in the command control, and execution of the tactical and strategic operation of our armed forces, as already demonstrated in other areas around the world.

4.2. Policy Statements

Government shall:

(a) As a matter of urgency create space science and technology defence command units, within its defence ministry and agencies.

(b) Direct such units to fund necessary research and development programmes in S & T in collaboration with NASRDA, Nigerian Universities and Research Institutes.

4.3. Strategies

1. Production of robust, reliable and fail-safe mechanisms for military, communication and navigation.

2. Training simulation to be used in military disaster operations with the attendant reduction in causalities.

3. Participation of the nation's armed forces in the global search and rescue operations, using SST capabilities in order to reduce casualties in terms of dangers and disasters.

4. Using SST as a veritable tool in the fight against financial crime such as 419, by providing the Police with intelligence tracking and forensic information.

5. The training of Nigerian Defence Personnel in the use of space science and technology to meet national security and defence needs.

6. The development of the necessary space science and technology hardware and software for the need of Nigeria's Military establishments as required in the space age.

CHAPTER FIVE

UNDERSTANDING THE EARTH AND ITS ENVIRONMENT FROM SPACE, FOR NATIONAL DEVELOPMENT

5.1. Introduction

The earth is being seriously modified by man through its exploitation in order to enhance his quality of life. This exploitation has led to a series of problems especially of pollution of the earth's atmosphere, land and water, the attendant effects of which threaten the very existence of the very life whose quality we are trying to enhance. These modifications and various emissions need to be studied. Only space science and technology can enable us to do this effectively, cheaply and timely.

5.2. Policy Statement

Government shall vigorously pursue the study of the earth and its environment so that the exploration and exploitation embarked upon for the enhancement of the quality of life of its citizens is done in a sustainable manner in order to minimize any harmful effects

5.3. Objectives

(a) To enable understanding of the earth's atmosphere, Biosphere, Hydrosphere and Magnetosphere

(b) Improved understanding of the solar – terrestrial relations

(c) National Resources Inventory

(d) Weather and climate forecasts for assistance of agricultural development and daily socio-economic activities

(e) Monitoring air, water, marine and land pollution

(f) Understanding the ozone layer depletion and global climate change that has the potential to wipe out large populations in Nigeria's riverine areas.

(g) Enable advanced warning for natural and man made disasters such as flooding, earth quakes, volcanic eruptions and desertification.

(h) Create employment opportunities for talented young scientists.

(i) Production of international cooperation in the earth sciences.

5.4. Strategies:

(a) Encourage the study of Basic Space Science at all levels of learning.

(b) Develop a pool of Nigerian Scientists that can specialize in various aspects of upper Atmosphere physics in order to predict effects on :

  (i) Ground services

  (ii) Humans and air-crafts

(c) Develop a pool of scientists that can measure the levels of metals/toxic compounds over Nigeria in order to be able to determine their impacts on activities in agriculture, forestry and the natural resources in general and have the capability to proffer effective remedial actions to reduce the negative impacts.

(d) Build the capacity to adequately document the available natural resources (minerals, flora and fauna, water resources etc) in the country

(e) Develop capacity to understand the impact of stratospheric ozone depletion on ambient UV, and potential effects of enhanced UV-B radiation on exposed population over a long term.

(f) Establish an enabling environment for coordinating studies in basic space science for the development of Nigeria's space capabilities and enhancement of socio-economic benefits

(g) Coordinate monitoring activities at national and international levels for inter-comparison studies to ensure that the acceptable quality control assurance practice ethics are adhered to.

(h) Provide better ground and satellite based monitoring of all components of the earth system and its environment (spatially and temporally). This will enhance the monitoring activities.

CHAPTER SIX

SPACE COMMUNICATION APPLICATIONS

6.1. Introduction

Since the advent of the commercial uses of satellites in the 1960's with the launching of the "early bird", countries in Africa have been utilizing satellite communications in the traditional manner using facilities provided mainly by INTELSAT. Much has changed since then and yet African countries have not and are not participating actively in the evolution of the new satellite systems. Here in Nigeria the success of our information technology policy will depend largely on our satellite technology. Thus, we must act fast.

6.2 Policy Statement

Government shall use satellite communication system to enhance telecommunication services and applications.

6.3. Objectives:

(i) Accelerate economic growth rate through affordable telecommunication services.

(ii) Increase the tele-density of Nigeria within the next 10 years.

(iii) Provide telecommunication services in rural and remote areas.

(iv) Provide satellite broadcast services.

(v) Link Nigeria with the global information infrastructure.

(vi) Strengthen the development and extension of distance education.

(vii) Enhance healthcare delivery through telemedicine.

(viii) Provide satellite services which include data imaging, video conferencing, multimedia and global internet access.

6.4. Strategy

(i) Develop and acquire indigenous capability in satellite receiver technology.

(ii) Develop and acquire indigenous capability in satellite technology.

(iii) Develop and launch communications satellites that are secure and affordable.

CHAPTER SEVEN

EDUCATION AND TRAINING

7.0. Introduction

Education is a means through which individuals gain understanding of a particular subject or issues, to the extent that they may form independent opinions of the subject, establish priorities, understand the methodology and the techniques and their applications. It is concerned with the mental capacity, mental power and the attitude of people. Training is rather concerned with teaching individuals to carry out specific tasks based on accepted methodology and for which the techniques are known.

For any country to become involved in space science programmes and to use space science and technology effectively, the need for education and training for a large spectrum of people becomes imperative. Such groups range from policy makers and planners, managerial people in institutions, agencies, private enterprises and academia. Others range from consulting engineers and scientists, teachers at various levels of education and for a large spectrum of subjects, technicians/technologists and the general public.

7.2 Policy Statement

Government shall ensure the education and training of her citizens in order to break the vicious circle of scientific illiteracy in the country and thereby ensure the integration of research results in Nigeria into national planning and development.

7.3 Objectives

(a) To develop Nigerian youths as future policy makers to be aware of the immense social-economic benefits derivable from current and past developments in science and technology in general and space science and technology in particular.

(b) To develop a pool of Nigerian Scientists that can develop high technology products from space science and technology and thus ensure a sustained technological and industrial development.

(c) To participate in international programmes in space science and technology and thus ensure co-operation with foreign countries and international groups.

(d) Ensure success and derive benefits from high technology of the 21st century and beyond.

7.4. Strategies

(a) Rehabilitate all the deteriorated facilities in all areas of basic space science and technology in the country.

(b) Invest in all areas of space science research and training.

(c) Ensure continuity in policy thrust in training and research and entrench such policies in national planning and in the execution of major national projects.

(d) Ensure the continuous and mass education of policy makers, planners and decision-makers, as lack of doing so, could be a reason for non-attainment of greater heights in all areas of space science and technology in general.

(e) Allocate not less than 5% of the education Tax to training and research in space science and technology.

(f) Provide more scholarships to students for training in specific areas of space science and technology.

(g) Ensure the continuous funding of the center for space science and technology education at Ile-Ife which trains the trainers.

CHAPTER EIGHT

COMMERCIAL ASPECTS AND SPIN-OFF BENEFITS

8.1 Introduction

Space activities incorporate some of the most important areas of high technology such as computer hardware and software development; very large integrated electronic systems; Telecommunications; satellite manufacturing (all its component parts), life science, advanced materials and launch technology. These technologies will attract domestic and international trade, employment and other spin-off benefits. In fact, the low level of foreign investment attraction into the country as at now is because we have not ventured into this area.

8.2 Policy Statement

Government shall venture into space science and technology with dedicated commitment in order to derive commercial and spin-offs benefits and therefore enhance the technological and socio-economic development of the country and the enhancement of the quality of life of her citizens.

8.3 Objectives

(a) To cease to be only consumers of the spin-off of the commercial aspects of space science and technology.

(b) To actively engage in research and development efforts in space science and technology.

(c) To attract foreign industries into the country.

(d) To develop a pool of high technological scientists, engineers and technicians that can support our National Technology and Industrial development.

(e) To create jobs for the teeming unemployed but brilliant Nigerian youths, alleviate poverty and guarantee food security for the nation.

(f) To enhance international co-corporation that will guarantee peace and security of Nigeria and the world.

8.4 Strategies

(a) Opening of space science related industries, which would create jobs for Nigerian scientists, engineers and technicians at home and bringing back those in Diaspora.

(b) Provide enabling environment for the growth and development of space science and related technologies in Nigeria by:

i. Increased devotion to science and mathematics by students at elementary and secondary school levels.

ii. Establishing centers of excellence on specific aspects of space science and technology such as center for basic space science and education, remote sensing, communication etc.

iii. Enhancing the research capabilities of our tertiary institutions (Universities, Polytechnics etc).

Provide funds for R & D in all aspects of science and technology in general and space science and technology in particular.
Establish linkages with friendly nations that have well established and successful space programmes and with the will of assisting developing nations.

CHAPTER NINE

PROMOTION OF INTERNATIONAL COOPERATION

9.1. Introduction:

Apart from few periods of difficult times in the past, Nigeria has been enjoying very cordial and good relationship with many nations of the world and international agencies and bodies. Our venture into space science and technology will certainly open new areas of Links with the international community for us.

9.2. Policy Statement

(a) Nigeria supports international cooperation for the peaceful uses of outer space for the benefit and interest of mankind.

(b) Nigeria shall implement its space programme taking advantage of multilateral and bilateral cooperation with other space-related organizations in the world to promote domestic economic growth and development.

9.3. Objectives

(a) To peacefully develop and use space resources for the benefit of Nigerians and all mankind.

(b) To engage in bilateral and multilateral cooperation on the basis of mutual benefit and mutual complementarity.

(c) To build up the capability of space development of the country.

(d) Adopt measures to protect the space environment and space resources in the course of international space cooperation.

(e) To support the outer space application programmes of the United Nations.

9.4. Strategy

(a) Support multilateral international cooperation on the peaceful uses of outer space within the framework of the United Nations.

(b) Promote sub-regional and regional space cooperation within ECOWAS and Africa respectively.

(c) Promote space cooperation with both developed and developing countries.

(d) Support research institutions, industrial enterprises and universities to develop international space exchanges and cooperation in different forms and at different centres.

(e) To increase the nations capacity for co-operating with other nations of the world. Bilateral and multi-lateral relations/agreements should be established to achieving the following short-to long-term projects for the nations space programme:

i. Establishment of Ground receiving station

ii. Provision of mobile receiving stations

iii. Development of Nigerian Satellites for National resources management and effective communication

iv. Provision of archival materials on Nigeria to the national Remote sensing centre, jos and the centre for space science and technology education, Ile-Ife.

v. Free donation of books and other published materials on remote sensing and space related activities.

vi. Provision of computer hardware and software for all space related educational and research centres nationally.

vii. Sponsoring and Training of brilliant young Nigerians in various aspects of space science and technology.

viii. Global communications networking covering all countries of the region participating in ARCSSTE activities

ix. RASCOM (African countries to bury their differences and conclude this project for the benefit of the continent).

CHAPTER TEN

POLICY IMPLEMENTATION

10.1. Introduction:

- **The general feeling among Nigerians (the common ones, the big ones and even the educated ones), is that space science and technology is beyond our reach as a developing country.**

- The people think that our problems are mundane and earth bound and so the solutions to those problems must be sought on the ground with classical non-space based technology

- **This thinking is due purely to ignorance because, developments in space technology have enhanced the quality of life of the countries that have gone into it. Space Science and Technology touches every aspect of our lives. For example:**

  - Without satellites there would be limited communication, television reception, telephone calls, internet access, etc. These services would have been highly restrictive due to the prohibitive cost of alternative, earth-bound, transmission media such as cables and microwave radio systems.

  - Without space technology, we would not know where most of our mineral resources are hidden. Even today in Nigeria, some of the multinational companies in Nigeria are actively using foreign satellite-based imaging systems to map our country's resources for planned exploration, if not exploitation.

  - Without space technology we would never know the details of our ground water resources, soil resources, vegetation resources, and consequently our agricultural potential. Therefore, food security cannot be guaranteed.

- Due to space technology India is able to bring education to the doorsteps of most of her citizens in the rural areas. Furthermore, doctors can interact with patients in the remotest villages and bring them assistance without physically being there.

- **The United States can see on minute to minute basis who is moving in and out of ASO Rock. They may wish to see which of**

our jets are taking-off, and to where, using the power of satellite in outer space, without recourse to the Nigerian government.

- With the development in space, Japan and the United States are able to manufacture miniaturized computers that you can put in your breast pocket. They are able to speak to one another and at the same time see the person they are speaking to.

- Because of space technology, we have seen different types of products in the market, ranging from fire resistors, mobile telephones, improved drugs, high-speed computers and all kinds of electronic gadgets.

- The development in space science and technology has enabled nations to see what they cannot see under normal circumstances. This is how scanning systems to detect various cancers in the body were developed.

- The levels of water pollution, air pollution, land pollution over a particular area are easily detectable from space. Infact, when you are in space, you see everything happening on earth at a glance.

- From space Nigerians (and their security agents) can detect where a riot is developing anywhere in the country; where bush fire is occurring, where insects are attacking a crop land and where an aircraft is about to crash and many more.

- Finally, Nigeria as a developing country is characterized by:

  (a) explosive population growth with over 75% of the population in rural areas;

  (b) low level of human resources development especially in science and technology;

  (c) inadequate infrastructure especially for telecommunication and information dissemination;

  (d) low agricultural productivity;

  (e) unexploited solid minerals and other natural resources;

  (f) climate fluctuations and recurring disasters e.g. desertification; and

(g) soil erosion and other natural/man-induced hazards.

- These problems can be solved through the implementation of a national space science and technology programme

10.2 Policy Statement

Because of the immense benefits derivable from space science and technology for sustainable national socio-economic development and enhancement of the quality of life, Government shall provide considerable national resources, both financial and otherwise for the realization of the National Space Science and Technology Vision.

10.3 Objectives

(a) to develop indigenous capabilities for research and applications in major areas of space science and technology; and

(b) to use these capabilities as tools for natural resources management and environmental assessment for the development of an effective and efficient communication system, for training Nigerians in the application of modern technology and for sustainable development.

10.4 Strategies

(a) Build capacity in space science and technology development.

(b) Build communication satellites for various applications e.g. tele-communications, Direct Radio and T.V. broadcasting and distance education.

(c) Build Earth Observation Satellites, ground receiving stations and mobile receivers for resource survey and management, environmental monitoring, meteorological services and national security operations.

(d) Develop and operationalize indigenous satellite launch vehicles in the long run for space services.

(e) Encourage private sector participation in this enterprise by removing the barriers to such participation.

(f) Enhance the educational sector by building National Structures such as planetoria and centers of excellence that will stimulate the primary, secondary and Tertiary levels students and managers to embrace Space Science and Technology.

(g) Seek both bilateral and multilateral co-operation at regional and international levels in the implementation of this programme.

(h) Establish a Space Science and Technology FUND (SSTF) to be administered by the National Space Council through the National Space Research and Development Agency (NASRDA).

SCOPE OF THE NATIONAL SPACE PROGRAMMES

1.1 Introduction

If Nigeria is to move forward, science and technology must have a pivotal place in its development agenda. The attainment of the nation's milestone in scientific and technological development rests on its political and resource commitment to continuously master, develop and utilize science and technology to meet its local needs and to successfully compete in the global markets. An integral part of that commitment is our determination to systematically build our nation's space capability, and in the process develop opportunities and sustain initiatives that offer better, more reliable and cheaper alternatives to known methodologies or provide new directions for the advancement of Nigeria.

In furtherance of these objectives, and given the roles of space science and technology in virtually all aspects of our daily lives, including defence, national security, and law enforcement, Nigeria must place its space programme, as is the practice world-wide, under the umbrella of the Presidency. Accordingly, it is hereby recommended that the Nigeria Space Council be established immediately and chaired by Mr. President.

The action plans, tools, strategies and financial requirements that must be in place for a successful implementation of the nation's programme are detailed in the programme. If these programmes are faithfully implemented in the coming years, Nigeria's committed participation should yield dividends and should address our nation's needs as much as possible.

We must take these steps in order to transform our nation, Nigeria, from its 40 year-status as a developing country to that of a vibrant industrialized country of the future. Our understanding of outer space and determined contributions to its exploration and utilization should accelerate the development of Nigeria, including the enhancement of the quality of life of its citizens. That is the focus of this programme.

1.2 Programme

The initial scope of the Nigerian Space Programme (NSP) should include:

(a) The study of basic space science in order to lay the foundation for deriving maximum benefits from the nation's participation in the space enterprise;

(b) For the attainment of space capabilities, Nigeria's efforts should focus on research and rigorous education, engineering development, design and manufacture, particularly in the areas of instrumentation, rocketry and small satellites as well as in satellite data acquisition, processing, analysis and management and related software;

(c) The establishment of a national earth observation station for remote sensing and satellite meteorology data acquisition. Such an infrastructure will enhance indigenous ability to adopt, modify and create new techniques for national resources inventories, monitoring, evaluation and management; and

(d) The provision of efficient, reliable and adequate telecommunication services in Nigeria in order to enhance the growth of the industrial, commercial and administrative sectors of the economy.

1.3 Sub-programmes

1.3.1 Basic Space Science

This is a key to prosperity of the nation and it is crucial to any country's significant economic and social development. Without a sound educational and research base in the field of basic space science, there cannot be any expectation of practical benefits for the country's citizens.

A. Objective.

The goal of basic Space Science therefore is to pursue capacity building (manpower and infrastructure development) that can address the developmental needs of the country in several areas such as:

i. Astronomy/Astrophysics

ii. Solar terrestrial physics

iii. Cosmology and Origin of Life

iv. Meteorology and Climatology

v. Ionosphere physics

vi. Geomagnetism

vii. Communication physics

viii. Remote Sensing

ix. Rocketry and Balloons

x. Satellite Science and Technology

B. Strategies

In order to carry out these tasks successfully, the following mechanisms that would ensure an effective mobilization of the scientific community, the younger generation and the general public should be addressed:

i. Undertake a very comprehensive inventory of available human capacity and infrastructure for basic space science;

ii. Acquire facilities for the popularization of space science in the county;

iii. Procure basic equipment needed for research, data acquisition, processing and analysis;

iv. Collaborate in well-defined projects with other countries. In such collaboration, Nigerian scientists and engineers must be

v. involved ab-initio in the design and developmental processes.

C. Proposed Projects

The proposed projects in the field of Basic Space Science are the following:

(i) **Build a National Planetarium in Abuja**:

The aim of this project is to popularize space science and other sciences. Such a facility will also enhance the understanding of Nigerians of their place and role in the universe.

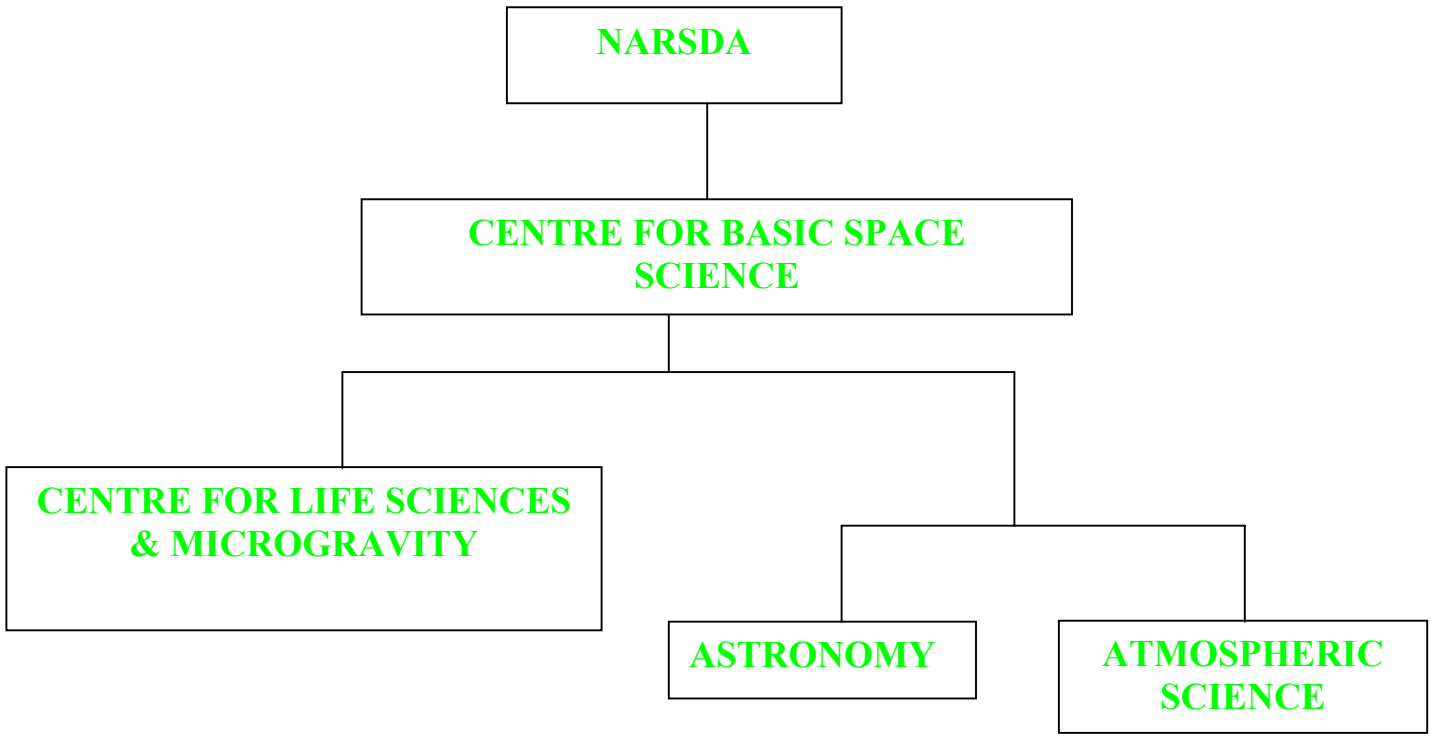
(ii) **Design and fabricate instruments and systems**

These should be relevant to basic space science and technology, which will involve the following:

- Basic space observation instruments (e.g. telescopes, cameras, mirror systems etc);
- Sensors and payload systems on satellites;
- Systems programming and software development to support basic instruments for data acquisition, archiving, and dissemination.
- Collaborative projects on radio and optical astronomy, solar physics, and atmospheric sciences with international space technology organizations and institutions.

Organogram for Basic Science is as shown in Figure 2.

Fig.2.0 ORGANOGRAM FOR CENTRE FOR BASIC SPACE SCIENCE



1.3.2 Remote Sensing

(a) Introduction.

Remote Sensing is the technology developed to obtain primary data about objects on the surface of the earth from space altitude. This is accomplished by making use of the energy emitted, reflected, or refracted by the sensed objects. The information obtained through this process is used for the assessment and management of natural resources as well as the environment.

Data and information provided by Earth Observation systems are lenses by which societies are able to gain deeper knowledge and understanding of their operating environment. Thus, a society that is information-rich and information-sensitive has a greater chance of coping with the task of managing complex and interrelated systems, not only in terms of data collection and analysis, but also in the political and policy sense of the open access and active use of such information in national planning and management.

Accordingly, a number of remote sensing imperatives has been identified as part of our national space programme. Specifically, it is necessary to phase the establishment of the nation's remote sensing programme into short (3 years), medium (10 years) and long (above 10 years) term objectives as follows:

(b) Proposed Projects.

(i) Short Term

The short term remote sensing programme of the nation should address the following:

- Develop the permanent site of the national remote sensing centre in Jos.
- Develop, design and build a national Earth observation ground receiving station. Such a project should be accomplished through a partnership arrangement of Nigerian scientists and engineers with selected foreign partners.
- Build laboratories and procure laboratory equipment and computers for signal/image processing.

- Recruit and train a core of software/hardware engineers that can contribute to image processing and analysis operations.

- Organise necessary education and training programmes that will sustain the operation and management of the nation's remote sensing programme. The category of staff affected by such education and training programmes include those responsible for:

  - Management of the ground receiving stations

  - Image processing

  - Software and Hardware development and production

  - Image interpretation and analysis

(ii) Medium and Long Term

The nation shall also introduce basic imaging science into the education curricula at the secondary school level.

- The nation shall attain indigenous competence in developing, designing and building its own Earth observation and communication satellite by the year 2003.

- Nigerian engineers and scientists shall contribute to the building of sensors and cameras that can be mounted on our own satellites to meet our resources and environmental data needs. Facilities for such operations should initially be established as part of the SHEDA Science and technology Complex, Abuja

The medium and long-term objectives should therefore be:

- Education, training and retraining of staff in different areas of need.

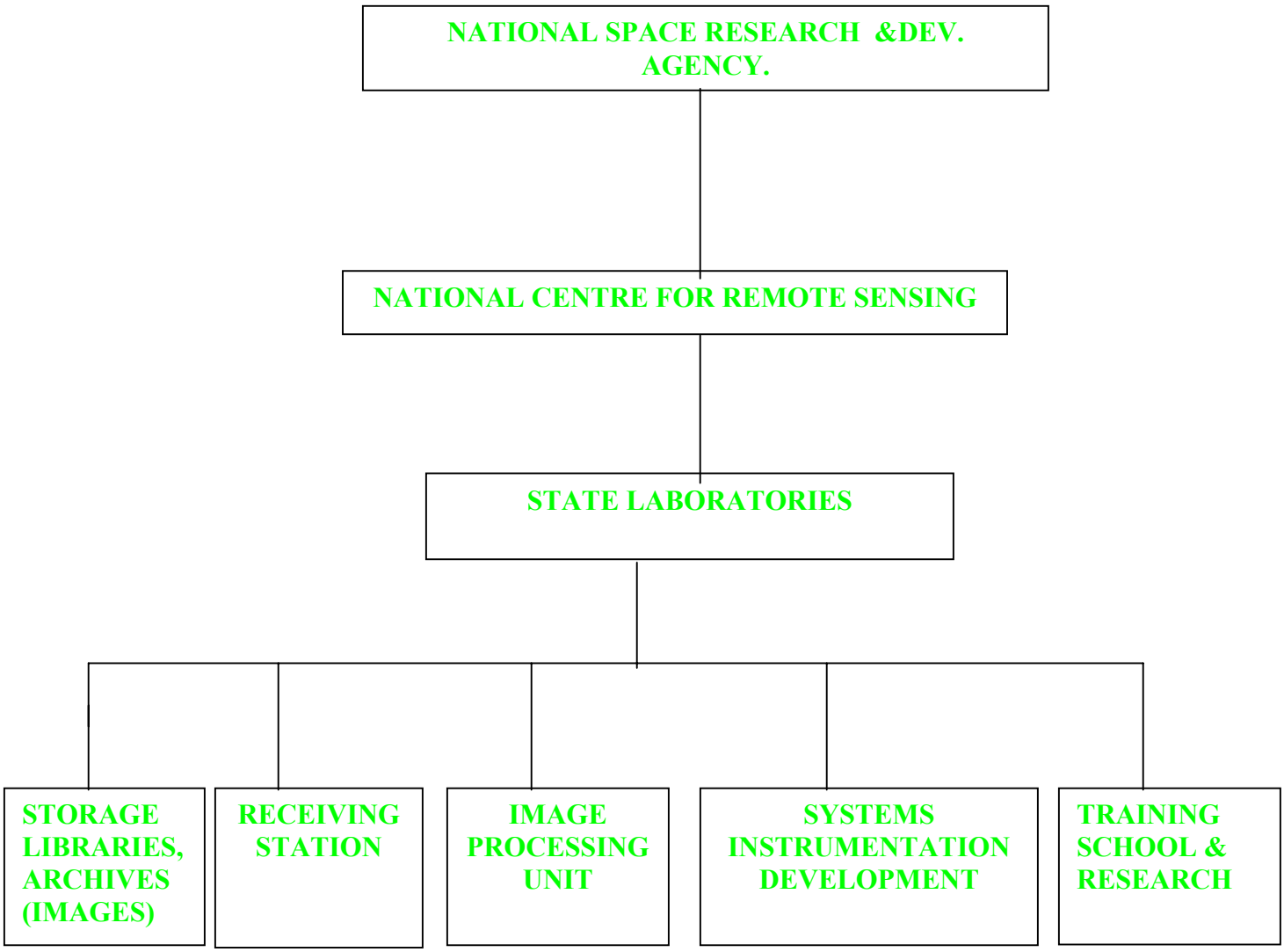
- Full operation of the Ground receiving station as an independent entity and by indigenous manpower.

- Develop and build mobile receiving stations for special purposes.

- Establish areas of research and development with tertiary institutions and the private sector.
- Harmonise remote sensing requirements in the country with the development of the Nigerian satellite.
- Execution of planned national programmes and new initiatives.

The proposed organogram of the Nation's Remote Sensing Programme is as shown in Figure 3.

Fig. 3. REMOTE SENSING ORGANOGRAM



1.3.3 SATELLITE TECHNOLOGY DEVELOPMENT CENTRE

The Satellite Technology Development Centre shall be the primary focus for the development of Satellite payloads for both geostationary and non-geostationary satellites. In particular, the centre shall collaborate with the Surrey Satellite Limited in the fabrication and launching of Nigeria's First Orbital Satellite, NIGERSAT–1. Thereafter, it will seek collaboration with other specialized agencies, institutions and companies in capacity building and development of advanced satellite systems for both remote sensing applications and communications.

A. Proposed Projects

(i) Collaborate with SSL in the fabrication, design and launch of NIGERSAT-1.

(ii) Develop the core competence and critical mass of Scientists and engineers in Satellite Sub–systems design.

(iii) Develop Laboratory and Assembly plant for the production of ground station receivers.

(iv) Develop satellite sub-system test such as:

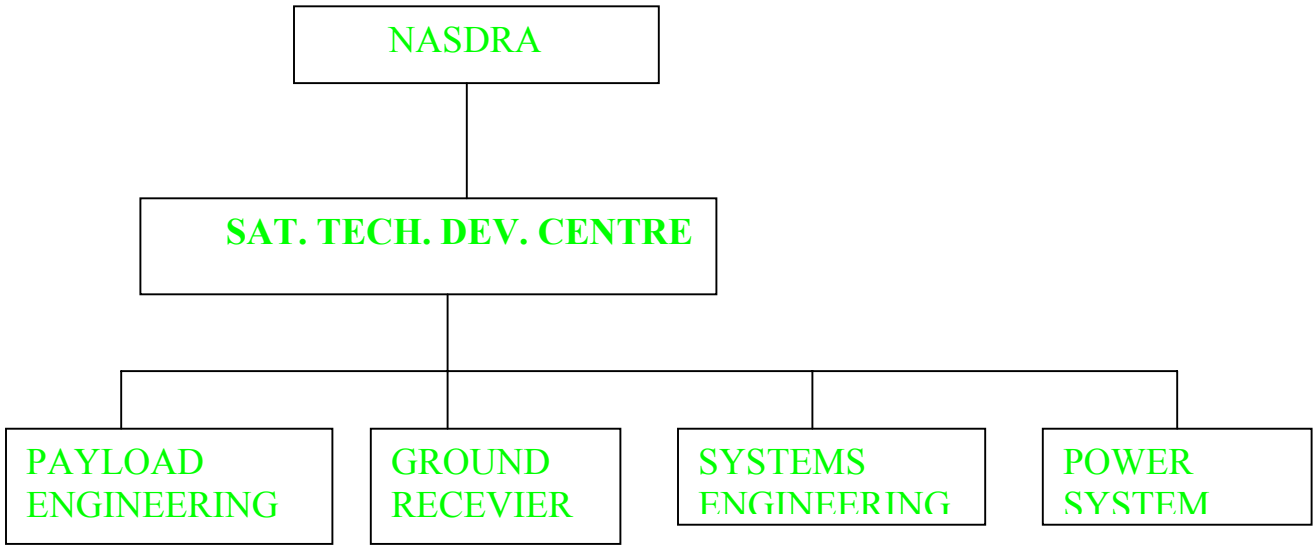
- Safety checks
- Dc Power checks
- Grounding
- HPA
- LNA
- Up and Down Converters
- IF
- Cooling,
- Phase Noise, etc

(v) Collaborate with other Nigerian institutions in the development of efficient power systems such as solar

power for use in satellite sub-systems. See Figure 4 for the organogram of the STDC.

(vi) Explore collaborative efforts with other countries and companies with space capability and know-how.

Fig.4 SATELLITE TECH. DEV. CENTRE



1.3.4 GEODESY AND GEODYNAMICS

A. Introduction

Geodesy and Geodynamics form an integral part of the National participation in all International Co-operative programmes and projects for applied Space Geodesy consistent with the goals for National Security, economic development and environmental hazard monitoring and management.

The eventual goal of the Geodynamics and Geodesy programme is to achieve Nigeria's capability, manpower and hardware development that can sufficiently address the following national issues.

(i) Surveying and mapping

(ii) Remote sensing for mineral exploration.

(iii) Coastal deformation and subsidence.

(iv) Floods and global mean sea level monitoring

In order to carry out this task successfully, the following mechanisms that would achieve the above goals should be addressed:

(i) Implementation of existing signed agreements, with modification if deemed necessary, with NASA, NOA with respect to satellite Laser Ranging (SLR), Very Long Baseline Interferometery (VLBI) and co-operative International GPS network.

B. Proposed Projects

The proposed projects in the Geodesy and Geodynamics programme shall include the following:

Space Geodesy and Geodynamics Centre at Toro, Bauchi State.

The choice of the Toro site is based on a solid geological bedrock (the "older granites") that can serve as immobile belt on which Sensitive tracking systems can be situated. This site shall, in addition to Satellite tracking, be responsible for:

(i) Monumentation and footprints survey in accordance with guidelines of the space Geodetic Measurement sites sub-

committee of the international coordination of Space Techniques for Geodesy and Geodynamics.

(ii) Training of observatory personnel and researchers in Nigeria and at NASA, NOA, JPL in USA and other Space Research Centres worldwide.

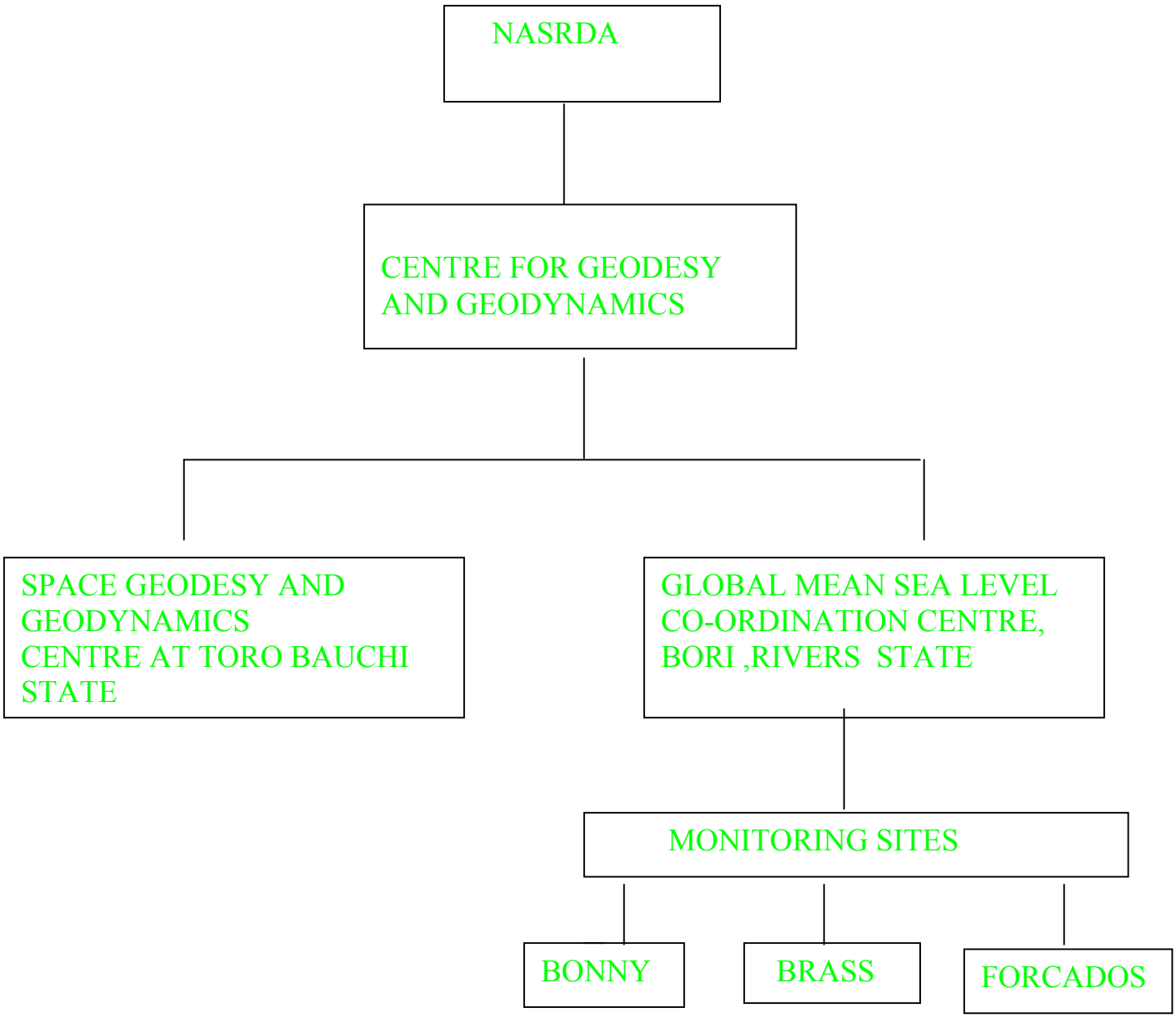
(iii) Funding of Small projects set-up at designated local Universities and institutes thereby developing a service scheme attractive to emerging physical scientists and mathematicians.

(iv) Organize Symposia, seminar, lectures, and workshops to propagate its works and programmes.

(v) Global mean sea level monitoring network centre at Bori, Rivers State.

This proposed center should be responsible for co-ordination of the monitoring of coastal deformations, subsidence, flood and global mean sea level at specific sites at Bonny, Brass, Forcados and Lagos. From all these mobile sites, eventual reference will be made to the station at Toro, Bauchi State. See Figure 5 for the organogram of the Space Geodesy and Geodynamics.

FIGURE 5 ORGANOGRAM FOR GEODESY AND GEODYNAMICS



1.3.5 CENTRE FOR SPACE TRANSPORT AND PROPULSION.

A. Introduction

This proposal actually deals summarily with the logistics and modalities necessary to establish a viable, functional and highly productive CENTRE FOR SPACE TRANSPORT AND PROPULSION. The high level advancement and developments recorded in Telecommunication, Meteorology, space exploration and Military Technology in America, Europe and Asia have been made possible through the spirited efforts of their engineers and Scientists and genuine national policy focused on rapid advances in the Sciences and Technology of Rocketry. Rockets are the main transportation vehicles for all these applications.

In view of the above, it has become imperative and expedient for Nigeria to take the initiative in this part of the world being the largest country in Africa and its Diaspora to develop and acquire Rocket Technological capability.

B. Objectives

The Objectives of this are as follows:

(i) To develop the Engineering and Scientific ability necessary to produce Space Transportation Vehicles (Rockets).

(ii) To develop and acquire the necessary Technology to manufacture the necessary components for rockets.

(iii) To develop various types of fuels for Rocket Propulsion, which may either, be solid fuels or liquid fuels or any other form of energy

(iv) To develop the Technological capability to launch Rockets for both military and civil applications.

C. Strategies

The development and acquisition of the above objectives and capability can only be achieved by establishing Rocket Propulsion Department with its complementary laboratories as an arm of the National Space Research and Development Agency.

These laboratories must be fully equipped and staffed to carry out effectively basic Research and Development work in Rocket and Space Vehicle Technology and they are listed as given below.

(i) Chemical Engineering Thermodynamics Laboratory

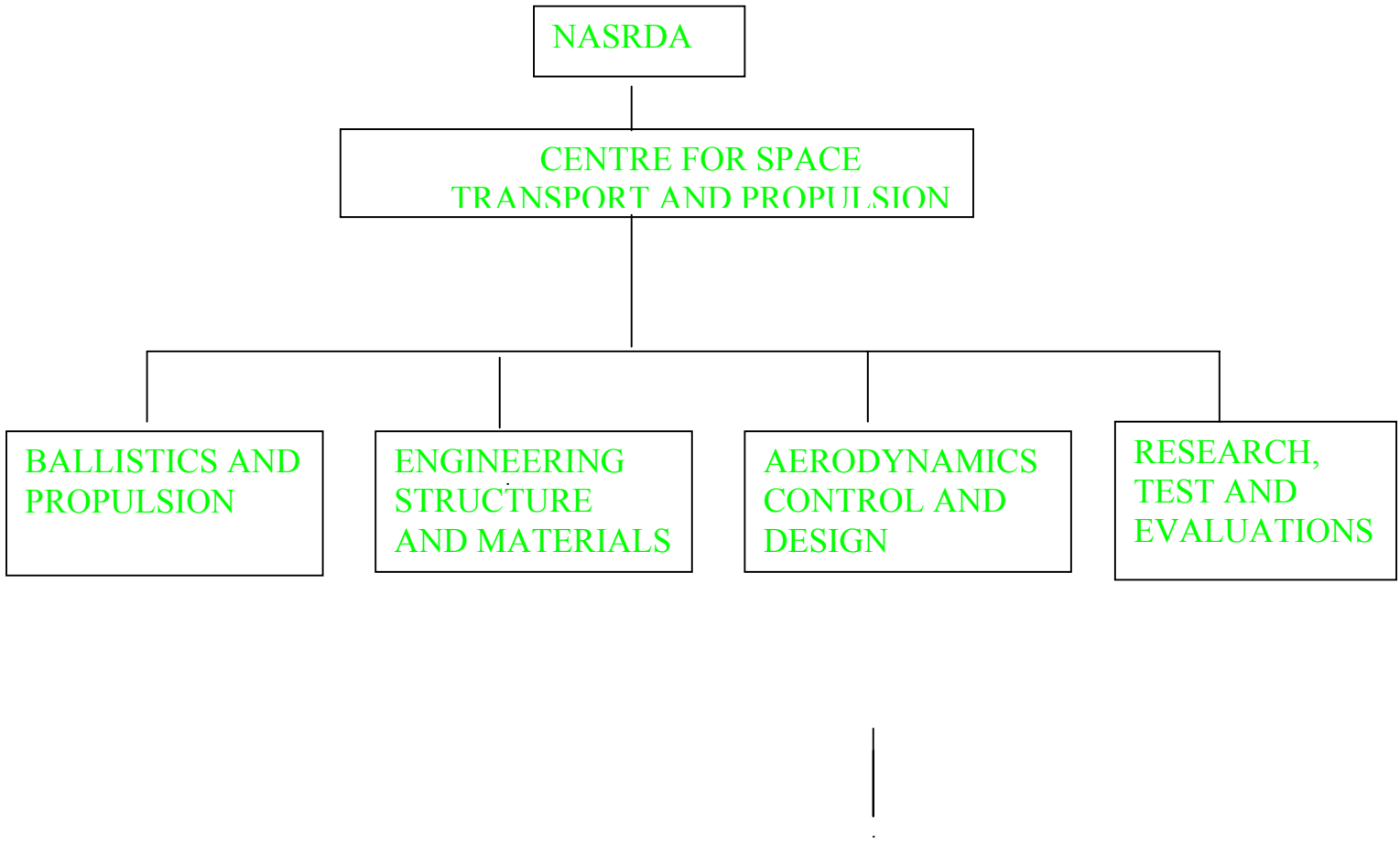
(ii) Rocket Engines/Motors Laboratory

(iii) Engineering Materials Laboratory

(iv) Structural Laboratory.

(See also Figure 6)

FIGURE 6. THE ORGANOGRAM OF CENTRE FOR SPACE TRANSPORT AND PROPULSIONS



1.3.6 CENTRE FOR SPACE SCIENCE AND TECHNOLOGY EDUCATION

A. Introduction:

CESSTE has been established as an educational and research institution in order to train the trainers. In other words it is an institution for those who already have one form of knowledge or the other, on space science and technology.

B. Objectives

The development of skills and knowledge of university educators, research scientists and other personnel in four principal focal areas namely:

(a) Remote sensing and geographic information systems (RS/GIS) satellite communication and Global positioning system (SC/GPS), meteorological satellite Applications (MSA) and Basic Space and Atmospheric Sciences Technology (BAST)

(b) The training of Educators in the development of SST curricula that can be used to advance the knowledge of scholars.

(c) Aid research scientists and project personnel in preparing space-derived information for presentation to policy makers in charge of national and regional development programmes.

(d) Undertake and encourage regional and international co-operation in SST programmes

(e) Aid the dissemination of information to the general public on the benefits and applications of SST to improve the quality of life; and

(f) Contribute to sustainable development and provide for the conservation of all earth resources and the national environment.

C. Short and Long Term Projects

(j) laboratory facilities for the four divisions

(ii) Central computer center with main-frame and other computers

(iii) Conference room

(iv) Library

(v) Information and public affairs facilities

(vi) Power generation

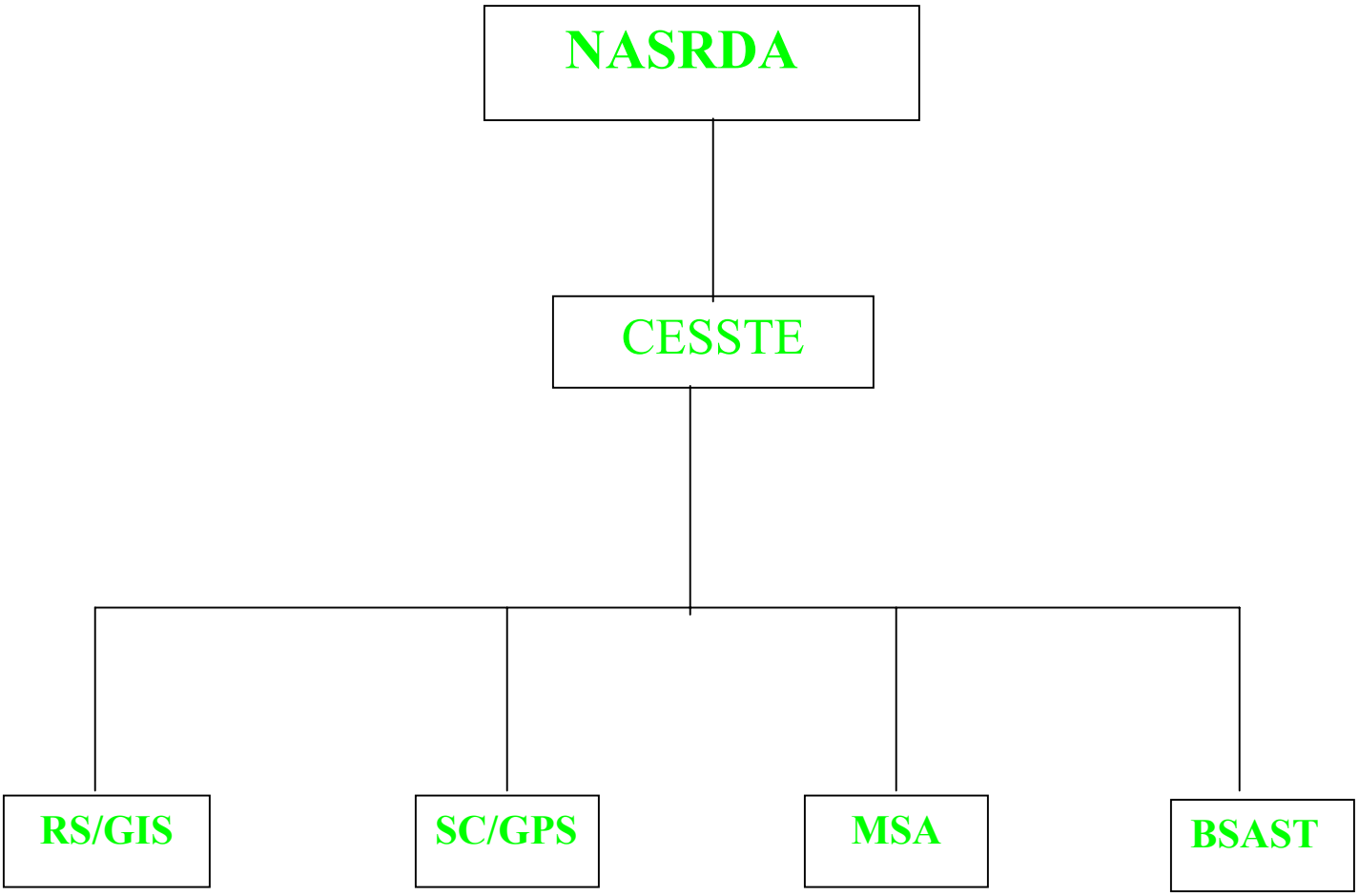
(vii) Telescopic observation

(viii) Staff Housing

See Figure 7 for the Organogram of the Center.

FIGURE 7

ORGANOGRAM FOR CESSTE



RS/GIS *– Remote Sensing and Geographical Information System.*

SC/GPS *– Satellite Communication and Global Positioning System.*

MSA *– Meteorological Satellite Application.*

BSAST *– Basic Space and Atmospheric Sciences Technology.*

1.4 Financial Requirements

It is estimated that the initial take-off fund for the implementation of the National Space Programme shall be $30.13m[1]. The requirement for the next 3 years will be $25.5m annually. See details in Annex II.

[1] Nigeria on November 7, 2000 signed an agreement with SSTL of United Kingdom for the design, construction and launching of micro satellite for the sum of $10.5m.

ANNEX 1

1.1 NATIONAL SPACE RESEARCH AND DEVELOPMENT AGENCY (NASRDA)

STRUCTURE OF THE AGENCY

A. The Agency shall have:

(i) A headquarters responsible for the coordination of the space Programme and its implementation both at the headquarters, Centres and Units.

(ii) Development Centres and Units in which training, research and development activities, production of goods and services are carried out.

B. The Headquarters shall have the following offices and departments:

(a) Office of the Director-General and Chief Executive.

(b) Department of Finance and General Administration with the following Divisions:

(c) Department of Education, Outreach and Commerce Divisions:

(d) Department of Information and Policy and Planning with the following Divisions:

(e) Department of Bilateral and Multilateral Cooperation Division:

Each department may have divisions as may be deemed fit.

C. Each of the above Departments will be headed by a Director while each Division will be headed by a Deputy Director. In addition to the above the internal Audit will be supervised by the Director-General/Chief Executive.

d. The Development Centres will be headed by Director/Chief Executives.

1.2 COMPOSITION OF THE TECHNICAL ADVISORY COMMITTEE.

The Honourable Minister of Science and Technology shall appoint a 12 member Technical Advisory Committee comprising of 7 distinguished Engineers and Scientist with expertise in the relevant areas of Space Science and Technology, a representative from the Armed Forces, Security Agencies, Organised private Sector, Nigeria Academy of Science and the Nigerian Academy of Engineering. The National Space Research and Development Agency shall provide the Secretariat.

1.3 COMPOSITION OF COMMITTEE ON INTERNATIONAL COOPERATION.

The Honourable Minister of Science and Technology shall appoint a committee on international Cooperation comprising of representatives of the Presidency, National Planning, Foreign Affairs and The Federal Ministry of Science and Technology. The Committee shall advice the Agency as the need arises on bilateral and multilateral cooperation in the implementation of its programmes.

ACRONYMS

ARCSSETE	African Regional Centre for Space Science and Technology Education
COPOUS	United Nations Committee on the Peaceful Uses of Outer Space
DOMSAT	Domestic Satellite
ECOWAS	Economic Community Of West African States
FAO	Food and Agricultural Organisation
GIIS	Global Information Infrastructure System
GPMSS	Global Personal Mobile Satellite Service
GPS	Global Positioning System
GSO	Geosynchronous Orbit
ICT	Information and Communication Technology
IMMARSAT	International Mobile Satellite Organization
IMSD	Integrated Mission for Sustainable Development
INTELSAT	International Telecommunication Satellite Organization
LAN	Local Area Network
LEO	Low Earth Orbit
MHZ	Mega Hertz
NASA	National Aeronautics and Space Administration
NASRDA	National Space Research and Development Agency
NCST	National Council for Science and Technology
NITEL	Nigerian Telecommunication Limited

NOAA	National Oceanic and Atmospheric Administration
NSA	National Space Administration
NSC	National Space Council
RASCOM	Regional African Satellite Organization
RECTAS	Regional Centre for Aerospace Surveys
SSAP	Senior Special Assistant to the President
SST	Space Science and Technology
SSTF	Space Science and Technology Fund
TTC	Telemetry, Tele-command and Control
UV	Ultra Violet
VSAT	Very Small Aperture Terminal
WAN	Wide Area Network
WMO	World Meteorological Organisation

APPRECIATION

The Technical Advisory Committee wishes to place on record its appreciation to the Honourable Minister of Science and Technology, Prof. T.I. Isoun, for ensuring that the production of the National Space Science and Technology Policy and Programmes was achieved without any hitches.

The Committee also wants to convey its gratitude to the Senior Special Assistant to the President on Space Science and Technology, Dr. Adigun Ade Abiodun for his committed effort in organizing and leading a 24-man Committee which produced a document which was a major working document used by the Committee. The imputs of Prof. P.O. Adeniyi are also highly appreciated.

We would also like to express our profound gratitude to the Director-General of NASRDA, Prof. R.A. Boroffice and his staff for providing imputs and the logistic supports and ensuring that the work of the Committee was smoothly carried out.

Finally, we wish to thank God and pray for the good health and strength of Mr. President, Chief Olusegun Obasanjo to be able to execute this programme to its logical conclusion. Long Live the Federal Republic of Nigeria.

MEMBERS OF THE TECHNICAL ADVISORY COMMITTEE:

1.	Prof. V.O.S. Olunloyo	-	University of Lagos -	Chairman
2.	Prof. P.N. Okeke	-	Uni. Of Nig., Nsukka	Member
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4.	Prof. S.E.Teme	-	RSUST P/Harcout	"
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11.	Mr. S.O. Mohammed	-	NASRDA
12.	Engr. T. Ahmed Rufai	-	"
13.	Chinyere Nzeduan	-	Office of the SSA/SST
14.	Mr. S.O.M. Onymaobi	-	FMST

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