

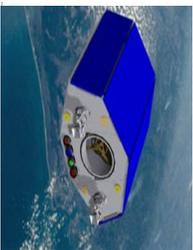
Nigerian Space Program and African regional perspectives,

Halilu Ahmad Shaba PhD

National Space Research and Development Agency,

halilu@nasrda.net

NASRDA IN HISTORY



- 1st intention to venture into Space in 1976 at ECA/OAU at Addis –Ababa (about 35 years today in this country)
- Allocated the sum of N10m between 1976-1980 to establish a Remote Sensing Centre.
- Inter –Ministerial Committee drew up a program for the Establishment of the National Remote Sensing Centre in April 1987.
- Constituted a National Committee on Space Application in 1987.
- Nine man expert Committee was set up to produce a draft National Space Science and Technology Policy.
- National Remote Sensing Centre took off in 1996 .
- **Established NASRDA in May 5th 1999.**
- Approved Space Policy in 2001

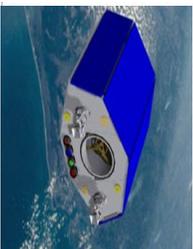
Goal And Objectives

GOAL:

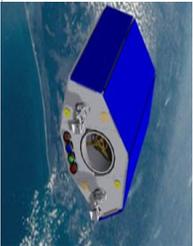
DEVELOP AND PROMOTE THE USE OF SPACE TECHNOLOGY AS A KEY DRIVER FOR SOCIO-ECONOMIC DEVELOPMENT

OBJECTIVES:

- 1. DEVELOP AND DEPLOY HIGH TECHNOLOGIES IN SPACE SYSTEMS FOR APPLICATION IN COMMUNICATION, EARTH OBSERVATION, OBSERVATORY AND SPACE TRANSPORTATION**
- 2. APPLY THE HIGH TECHNOLOGIES FOR INFRASTRUCTURAL DEVELOPMENT, RESOURCE & ENVIRONMENTAL MANAGEMENT INCLUDING APPLICATIONS IN HYDROLOGY, AGRICULTURE, WATER RESOURCES, EDUCATION, HEALTHCARE DELIVERY, SECURITY, ETC**
- 3. PURSUE THE DEVELOPMENT AND DOMESTICATION OF SPACE TECHNOLOGY AND ITS PRODUCTS TOWARDS ENHANCING JOB AND WEALTH CREATION**
- 4. DEVELOP INFRASTRUCTURE FOR GEOSPATIAL DATA ACQUISITION AND MANAGEMENT**



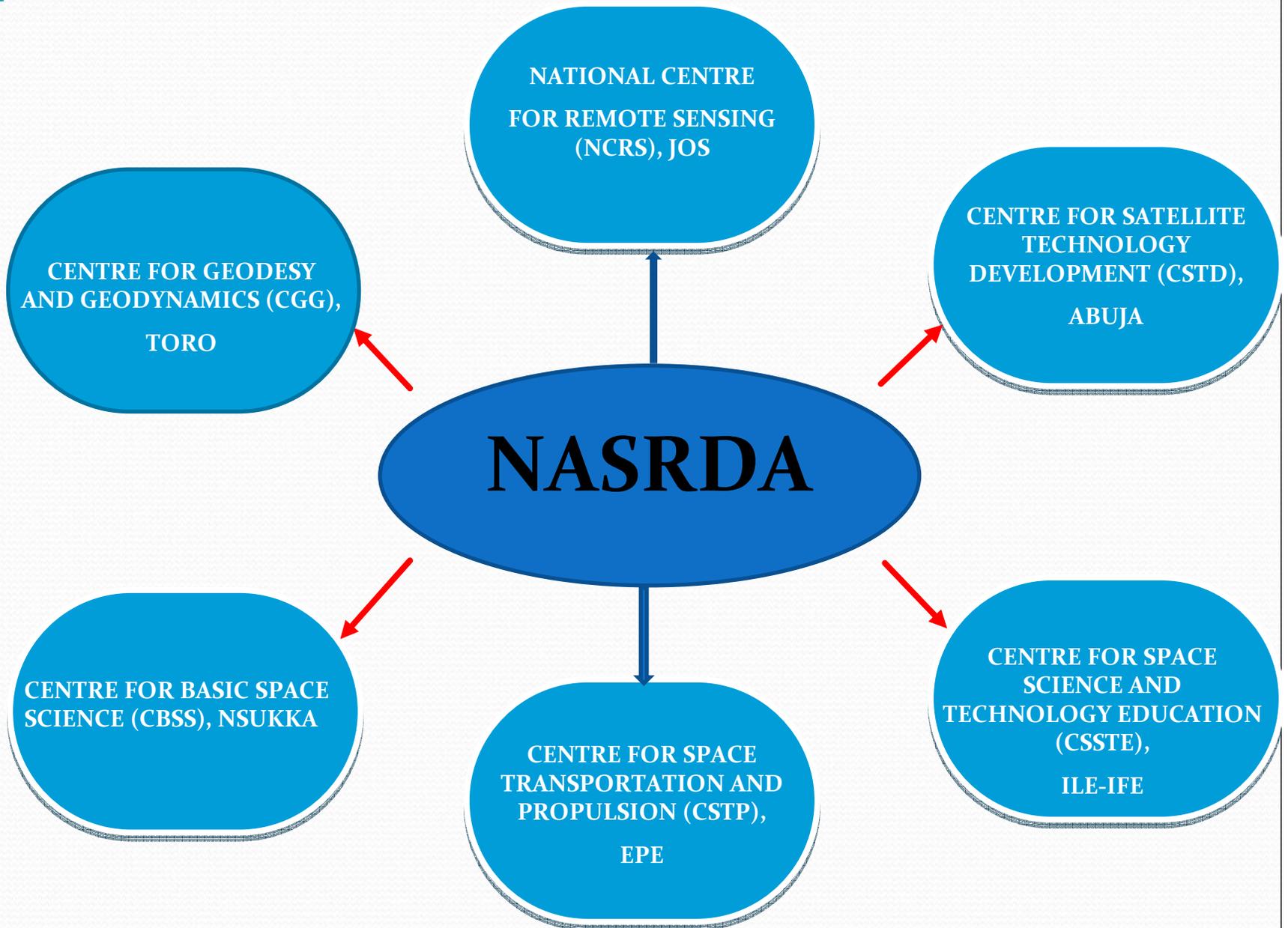
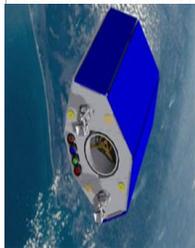
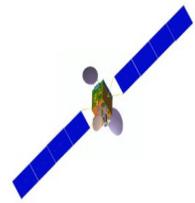
MANDATE OF THE AGENCY



Thus, the Agency shall;

- i. *Promote the co-ordination of space application programmes for the purpose of optimizing resources;*
- ii. *Develop national strategies for the exploitation of the outer space and make these part of the overall national development strategies;*
- iii. *Develop space technologies of direct relevance to national development;*
- iv. *Implement strategies for promoting private sector participation in the space industry;*
- v. *Strengthen capacity building and human resources development, which are required for the implementation of the national space programme.*

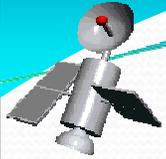
NASRDA AND ITS CENTRES



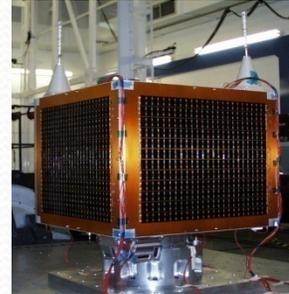
NEED FOR SPACE TECHNOLOGY DEVELOPMENT IN NIGERIA

Space Technology applications in the country using Remote Sensing and Communication Satellites are:

- Agriculture (e.g. crop condition, yield prediction);
- Environmental assessment and monitoring (e.g. urban growth, soil erosion, desertification);
- Renewable natural resources (e.g. water, natural flora, forests);
- Disaster prediction and management (e.g. flood warning and relief after flooding);
- Non-renewable resource exploration (e.g. minerals, oil, natural gas);
- Health hazard monitoring (e.g. predicting regions of mosquito hatching and subsequent risks of malaria infections, Telemedicine).



CURRENT AND FUTURE NIGERIAN SPACE CAPABILITIES



CURRENT

NigeriaSat-1

Launched September 27, 2003.

- One of seven micro-satellites being part of the Disaster Monitoring Constellation .
- Ground resolution of 32m and 600km swath width.
- Sensors in three spectral bands: green, red and near infrared .
- Life span of 5 years but still working perfectly in orbit Currently in its 9th Year



CURRENT AND FUTURE NIGERIAN SPACE NIGCOMSAT-1 TECHNOLOGY(Contd)

- launched on May 14, 2007
- Ku-Band will provide services for Telephony, Video, Data transfer, Telemedicine, Teleconferencing and Tele-education;
- Ka-Band will provide services for Telephony, Video, Data transfer;
- C-Band will predominantly be used for television signals and Internet data transmissions.;
- L-Band will augment GPS signals to about 3–5m and thus play a major role in security and surveillance.
- failed in orbit in November 2008 due to a technical hitch



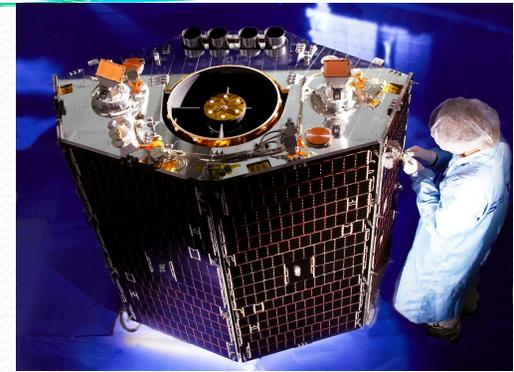


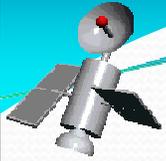
CURRENT AND FUTURE NIGERIAN SPACE TECHNOLOGY(Contd)

FUTURE

Nigeria-Sat 2

- 300 kg Earth Observation satellite.
- 2.5m panchromatic very high resolution, 5M and 32M Multispectral (NIR, Red, Green and Blue).
- The objectives of Nigeria SAT 2 includes
- Replacement of Nigeria SAT-1
- To meet the demand for High resolution Images both locally and internationally.
- Acquisition of Technical Know How on High resolution Images and Manufacture of Satellite.

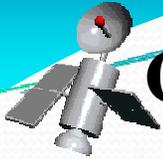




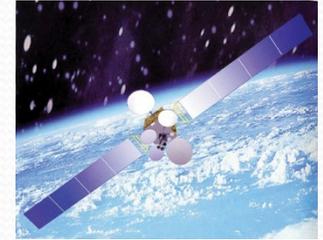
CURRENT AND FUTURE NIGERIAN SPACE TECHNOLOGY(Contd)

Nigeria-Sat X (NX)

- Developed to advance the Nigerian space Technology.
- Developed by a team of 25 Nigerian trainee engineers at SSTL
- The NX satellite is based on the SSTL-100 platform
- Features a 22 meter multispectral imaging system with a 600 km swath and it weighs about 100kg.



CURRENT AND FUTURE NIGERIAN SPACE TECHNOLOGY(Contd)



NIGCOMSAT-1R

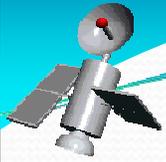
- Replacement satellite for Nigcomsat-1.
- NIGCOMSAT-1R is a super hybrid geostationary satellite.
- will have **C, Ku, Ka and L bands** respectively.
- will provide the most optimal and cost effective voice, data, video, internet and application service/solutions.

Hybrid payload design

- stronger footprints and centre beams over the African continent
- better looking angles and shorter latency for intra Africa communication traffic

NigeriSat-1

- Was used in 170 projects in Nigeria by researchers and MDA
- National Landuse/Landcover of the country at 1:100,000
- Its has increased researches in the area of Space Applications
- Encouraged the establishment of 13 Laboratories in some universities across the country
- Used for Disaster management and DMC- new Orleans Katrina
- Creating awareness in the areas of satellite applications

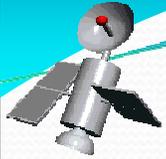


CURRENT APPLICATIONS PROJECTS

NASRDA has embarked on numerous projects to address the needs of the various thematic clusters of the vision .

E-Agriculture: The project intends to develop and implement real-time farming data and information assisted centres for Nigerian Farmers.

- **Telemedicine.** To improve remote diagnoses and to deliver a cost-effective, better-quality specialist services in Nigeria”
- Ibadan Teaching Hospital and Maiduguri Teaching Hospital, as well as some additional federal clinics



CURRENT APPLICATIONS PROJECTS

Tele-education: The Tele-education project is in collaboration with the National Open University of Nigeria (NOUN).

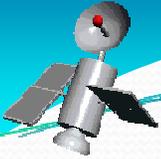
The project has a pilot scheme of 12 study centers located across the nation with a teaching administrative HUB at the NOUN headquarters in Lagos.

The network is capable of delivering lecture to the study centers depending on where the resource persons are located.

CURRENT APPLICATIONS PROJECTS



- **National Geospatial Data Infrastructure (NGDI).** The programme is coordinated by NASRDA .
- the harmonization and standardization of geospatial data production and management.
- the provision of a platform for data sharing thereby eliminating data duplication .
- conserving cost and time spent in producing already available data.
- **Integrated Mission For Sustainable Development (IMSD).** To generate for Nigeria an Integrated Resource Information System-NIRIS.
- **Cadastral Mapping And Urban Development.** To champion urban remote sensing, space technological development, cadastral mapping and its applications to achieve sustainable urban development in Nigeria and beyond.



FUTURE GOALS

- **Proposed International Telemedicine linkage.** The Agency has plans to extend the telemedicine network internationally.

Other Future Goals

- Training of Nigerian Astronauts 2015
- Building of Synthetic Aperture Radar 2015
- Development and Building of made in Nigeria Satellite 2018
- Development of Rocketry/Propulsion system 2025
- Development of Spin Off of Allied Industries- Electronics, Software 2026
- Large Scale Commercialization of Space Technology and Know how 2028

SPACE SYSTEMS & ENGINEERING

- **Astronaut Training and Launch to promote**
- Science culture and awareness
- Acquisition and development of allied infrastructure, facilities and skills
-
- **Satellite, Propulsion & Launch Technology Development**
- Development and acquisition of allied skills and Technologies including advanced manufacturing, aeronautics and power generation
- Establishment of local industries for manufacturing of components and parts.
- Spin-offs in the external economy
- Employment generation
- **Basic Space Education, Research and Development to provide challenges and incentives for our Scientists/Engineers and technical manpower in both public and private sectors**
- Modernization and improvement of our educational system

SPACE SYSTEMS & ENGINEERING

- **STATUS REPORT**
- The implementation of the road-map has commenced in bits on stringent budget since the year 2005.
- **Summary of recent activities**
- Training of 50 Engineers in China in the area of Communication Satellite that was launched in May, 2007.
- Hands on training of 25 Engineers in Surrey Satellite Technology Limited (SSTL), UK where 11 of them have undergone a Masters Degree and Technical Know-How for the 2.5 m resolution spacecraft tagged NigeriaSat-2 Project that has been launched in August, 2011
- Ongoing negotiation with CAST and CGW I for the Design and Construction of Assembly Integration and Test (AIT) / Design Centre (DC) for the manufacturing of spacecraft
- Negotiation for the equipping of the AIT/DC
- Ongoing negotiation for the construction of Launch Site and hands on training on rocketry
- Presently training over 43 Scientists and Engineers at the PhD level in relevant space technology and application areas in Russia, United States, United Kingdom, other European countries and China.
- Nigerian Scientist and Engineers have designed and built NigeriaSat-X, the satellite was launched in August, 2011 alongside NigeriaSat-2 using SSTL facilities
- The satellite control ground stations for both communication and remote sensing satellites are manned by Nigerian Scientist and Engineers in Nigerian Capital city Abuja.



DATA POLICY

- Data access in Nigeria is free for research but attract subsidized prices for consultancy in Nigeria.
- GeoApps Plus Limited has been licensed to sell data within Africa.
- Exclusive Agreement has been signed with DMCii to market data worldwide, except Africa.



INTERNATIONAL COOPERATION

UNSPIDER

- NASRDA has an Established Regional Support Office (RSO) within its campus and it is functional in support of all efforts of UNSPIDER in disaster management and Technical Advisory Mission.
- NASRDA worked with the Emergency Agency, NEMA, in Nigeria to process the two activated charters
- The RSO was part of the TAM mission to Nigeria and Cameroon
- Collaborated with NEMA and UNSPIDER office in a regional workshop in 2009, Nigeria to create awareness in Space Application to Disaster management

● African Leadership Conference

- Organized the First African Leadership Conference
- Participated in all African Leadership Conferences
- Is committed to all the declarations of the conferences

African Resource and Environmental Management satellite Constellation (ARMC)



Algeria



Kenya



Nigeria



South Africa

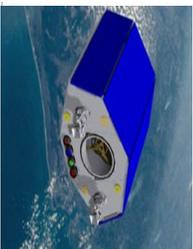


NIGERIASAT-2 AND ITS MAJOR ROLE IN ARMS USER REQUIREMENTS

- Agriculture (3–5m).
- Urban and Regional planning (1- 5m).
- Disaster monitoring (1–250m).
- Land use and Land cover mapping. (0.5m–5m)
- Water management (10m).
- Managed agriculture (1-40m).
- Map food vulnerability. (10m)
- Water resources assessment (1–10m).
- Drought status and disaster management (250m–1km).
- Mineral, oil and gas exploration (1–30m/60m).
- Peace-keeping missions (0.5-3m).

NASRDA AND AFRICA

- **Support Institutions in Africa with Data for research**
- **Taking part in projects for Africans and with African across Africa- GEOS, UNSPIDER, ARMC ETC**
- **Serving as Regional Support Office for UN-SPIDER**
- **Strengthening the two Constellations for benefit of humanity DMCII and ARMC**
- **Assisting in data revolution in Africa- COLLABORATING WITH AFRICANS (ALC)**
- **Developing capacity in space science and Technology**
- **Working closely with African Space Fairing Nations in supporting KENYA, GHANA and ETHIOPIA**



CONCLUSION

- Nigerian regional perspective is integrated in ALC while the National Policy is central to providing Nigerians with data and decision makers with information.



THANK YOU