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**Discussion on “Exploring space technologies for sustainable development and
the benefits of international research collaboration in this context”**

Statement submitted by

H.E. Mr. Mohammed H. Abdullahi
Honourable Minister of State for Science and Technology
Nigeria

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Federal Republic of Nigeria

**Exploring Space Technologies for Sustainable Development and
the Benefits of International Research Collaborations**

Paper Delivered by

Mohammed H. Abdullahi

**Honourable Minister of State for Science and Technology
Nigeria**

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Exploring Space Technologies for Sustainable Development and the Benefits of International Research Collaborations in this context in Nigeria

1.0 Introduction

Nigeria practically caught the vision of the comprehensive powers and benefits of space science and technology in about two and half decades ago and subsequently established the National Space Research and Development Agency (NASRDA) in 1999 to pursue the attainment of '*space capability as essential tool for sustainable socio-economic and scientific development of the nation*'.

As the global space industry navigates through a period of dwindling economic resources and reinventions, evidenced by a variety of changes, strategies and innovations in economic policies vis-a-vis space science and technology, Nigeria also tries to re-strategize her space activities, research priorities and operations without losing focus of her core objective of venturing into space.

2.0 Strides in Space Technology Development and Applications in Nigeria

Archiving the lofty goal of '*space capabilities for sustainable socio-economic and scientific development in Nigeria*' would be a mirage without concise, focused and integrated research collaborations and developments in key space technology and innovation segments. Therefore, in the past 21 years, Nigeria through NASRDA and her research centres have been involved in researches and training activities in:

- i. Earth observation systems/remote sensing;
- ii. Space applications in the core sectors of Nigeria's economy (agriculture and water resources, population, oil and gas, transport infrastructure, healthcare, mineral exploration general resource inventories, etc.);
- iii. Global positioning system and navigation for national mapping infrastructure and geodynamics investigations;
- iv. Atmospheric sciences;
- v. Satellite engineering development and technologies;
- vi. Space education and capacity building in astronautics, aerospace engineering, geoinformatics, and space physics;
- vii. Design and manufacture, particularly in the areas of instrumentation, rocketry and small satellites
- viii. Satellite data acquisition, processing, analysis;
- ix. Software development and management of related software, etc.

3.0 Benefits of Nigeria's International Research Collaborations

In the past two decades, Nigeria has been involved in various international collaborations on space science and technology, which have been of immense benefits to the country. These benefits cut across technical and scientific, socio-economic, physical, and security spheres in Nigeria. The following a few of the key benefits Nigeria is deriving from peaceful use of outer space technologies:

i. Technical and Scientific benefits

In the Nigeria's short-medium term implementations of her national space programme, international collaborations with SSTL, NASA, CGWIC, ROSCOSMOS, and many other

global space partners have resulted in the high-level training and capacity building of over 500 Nigerian engineers and scientists in the past 20 years. These manpower are presently spread across the globe, and leveraging on the know-how-technology-transfer (KHTT) for the advancement of the space research and development in Nigeria.

On Nigeria's space infrastructure, the development and management of the NigeriaSat-1, NigeriaSat-2 and NigeriaSat-X, NigComSat-1/1R spacecrafts could not have been feasible without international collaborations and support.

ii. *Health Care Delivery via Telemedicine*

In 2007, the National Space Research and Development Agency, Abuja Nigeria, initiated the telemedicine programme along with the Launch of NigComSat-1/1R, and recently with relevant collaborations at the advent of COVID-19 pandemic, the Telemedicine facilities were activated for mobile testing in Abuja. There are however few operational challenges with the implementation of the telemedicine project, which are being resolved.

iii. *Weather Forecast and Aviation Safety of Life*

Through international collaborations between Nigeria, WMO and, South Africa, the South Africa Weather Service (SAWS) provides daily weather and climate, aviation/flight safety and related product services for South Africa/Southern Africa and the rest of Africa.

iv. *Satellite Remote Sensing and Resource Mapping*

Through international collaborations, Nigeria has benefited in the areas of:

- *mapping and land information system,*
- *precision agriculture and water resources,*
- *crime monitoring and security mapping,*
- *forestry and ecology*
- *environmental and hazard monitoring and climate change information*
- *infrastructure monitoring and mapping (roads and building),*
- *geological and mineral mapping and exploration,*
- *real estate and town planning,*
- *marine/oceanography and hydrology,*
- *earth resource inventory and mapping,*
- *population estimation,*
- *mine fields delineation and mapping,*
- *National security and counter-terrorism geointelligence, etc.*

v. *Other key areas of benefits include:*

- (a) Asset tracking and traffic monitoring
- (b) Improved telecommunications and navigation services, etc.

4.0 Conclusion

There is therefore no doubt that, Nigeria's strides in exploring opportunities provided by international research collaborations in space technologies is helping her to evolve a strong framework for the sustainability of her socio-economic and scientific developments.