Research and Educational Opportunities in a Microgravity Environment for Developing Nations

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Outline

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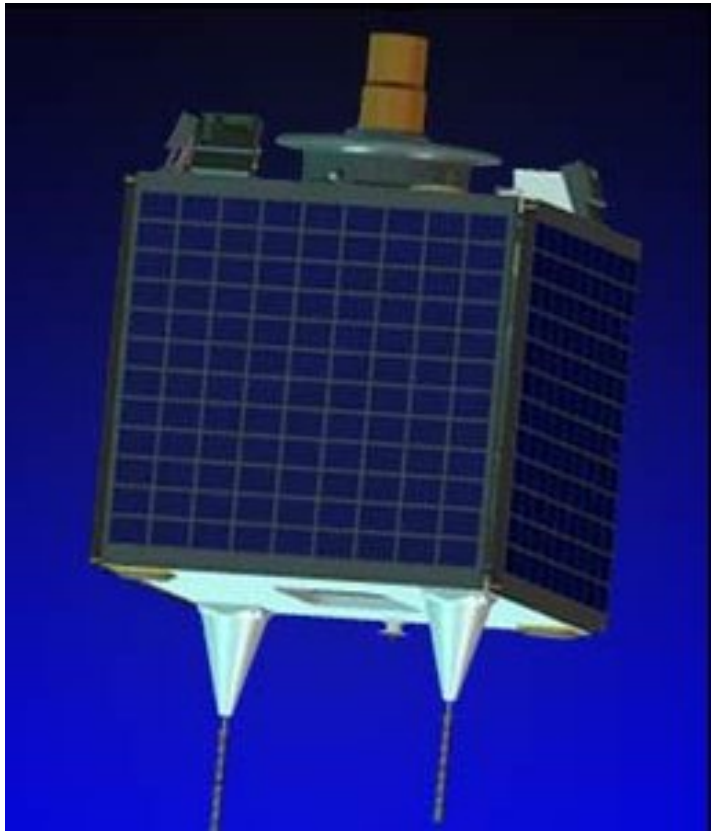
- Founded in 1999 as the National Space Research and Development Agency (NASRDA)
- Focus: developing and applying science and Technology for socio-economic benefit
- Goal: Achieving technological competence in the manufacture and launch of satellites by the year 2025.

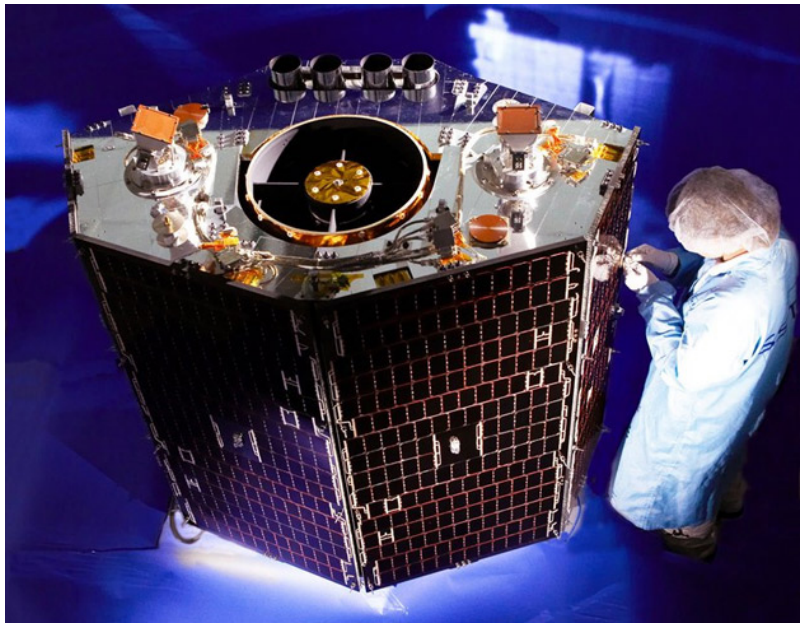
To date, three satellites have been built by the agency:

- NigeriaSat-1 - Launched in 2003, 32m resolution, 3 bands, altitude of 686km, member of the DMC



To date, three satellites have been built by the agency:

- NigeriaSat-2 - Launched in 2011, 2.5m resolution, multispectral imager, altitude of 700km, compatible with the DMC configuration



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The Activity centres of NASRDA are:

- Centre for Geodesy and Geodynamics (CGG), Toro
- Centre for Space Transport and Propulsion (CSTP), Epe
- Centre for Satellite Technology Development (CSTD), Abuja
- National Centre For Remote Sensing (NCRS), Jos
- Centre for Basic Space Science (CBSS), Nsukka
- Centre for Space Science and Technology Education (CSSTE), Ile-Ife

Nigeria has had good relationship with the UN and its space affairs office

- Member of several UN bodies/committees concerning space policy - UN-Spider for example
- Hosts a regional centre for space education, the African Regional Centre for Space Science and Technology Education - English (ARCSSTE-E)
- Signatory to major treaties and agreements concerning the peaceful uses of outer space

Space Education in Nigeria - National Strategy

- Space Science and Technology-related courses were introduced into the Nigerian University curriculum - Remote Sensing/GIS, Atmospheric and Climate physics as examples.
- An outreach programme is operated by NASRDA through the CSSTE: its objective is to popularize space science and technology in Nigeria

Space Education in Nigeria - National Strategy

In co-operation with UN-OOSA, the following courses are taught at the Postgraduate Diploma level at ARCSSTE-E

- Satellite Communication
- Remote Sensing/GIS
- Satellite Meterology
- Basic Space and Atmospheric Sciences

Courses in Space Law and Life Sciences are to be introduced soon

Space Research in Nigeria

Research in Space Science and Technology is divided into two broad areas

- Applied Research - This involves research into satellite technology, engineering techniques, Remote sensing/GIS applications (land-use/land-cover), Image Processing
- Basic Research - Astronomy/Astrophysics, Atmospheric and Climate Physics, Advanced Computation and algorithm development

Why Research/Education into Microgravity?

- It is a major part of national space policy
- Contributing to intellectual effort by humanity in that area of endeavour
- Curiosity!

What can HSTI do for a developing country like Nigeria?

In Education:

- Stimulate interest in science and technology among the youth
- Capacity Development
- Garner support for space-related research among the political class

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In Research:

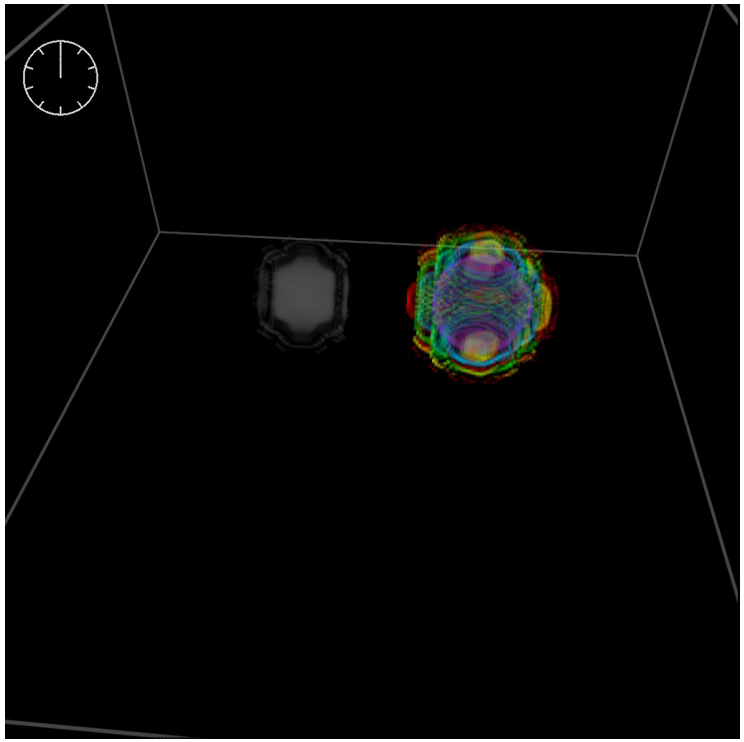
- Basic research in microgravity will now be possible for scientists in developing countries
- Make Low-Earth orbit accessible to less-privileged nations
- Allow contributions from scientists/engineers from developing nations to Human Space Technology

How can This be Achieved?

- Capacity Development in developing nations
- Resolve that a certain percentage of research time on the space station be made available to scientists/engineers of all nations
- Contributing to space education initiatives in developing nations

An Example of Co-operation:Advanced Computational Code Development for Basic Research

- Computational Code Developed Originally to Study Neutron Star-Black Hole Collisions: Original Code is a product of US/Germany/UK universities.
- With new observations from ISS - More accurate models can be made



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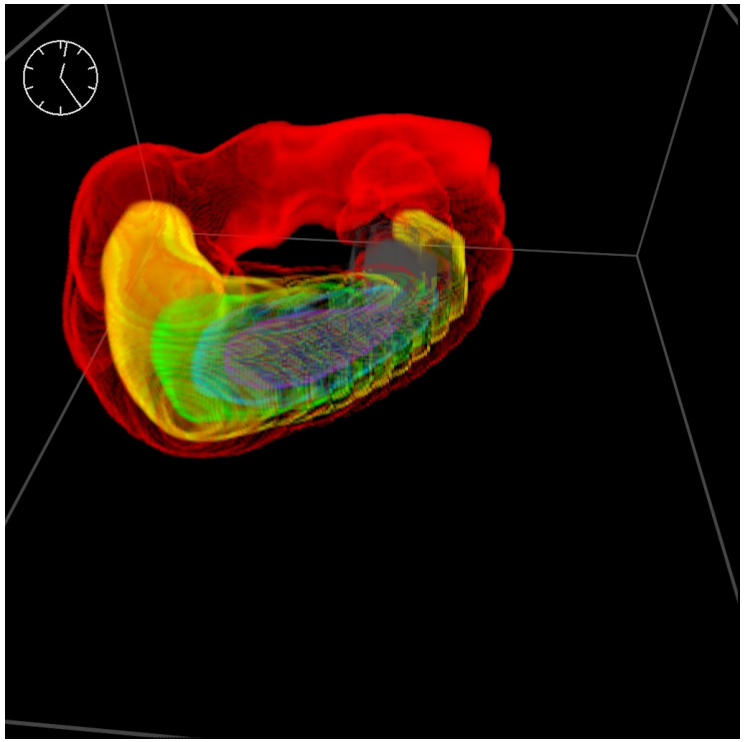

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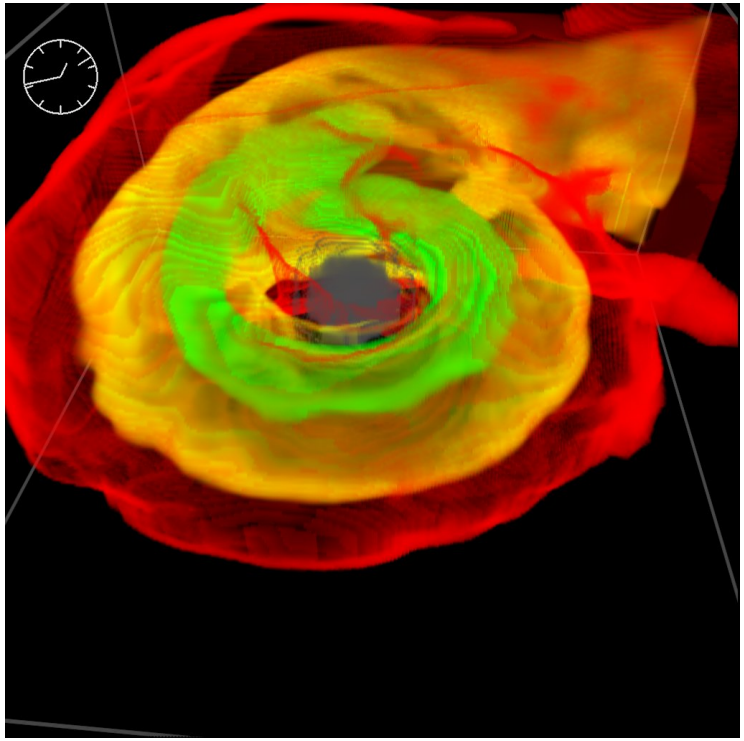

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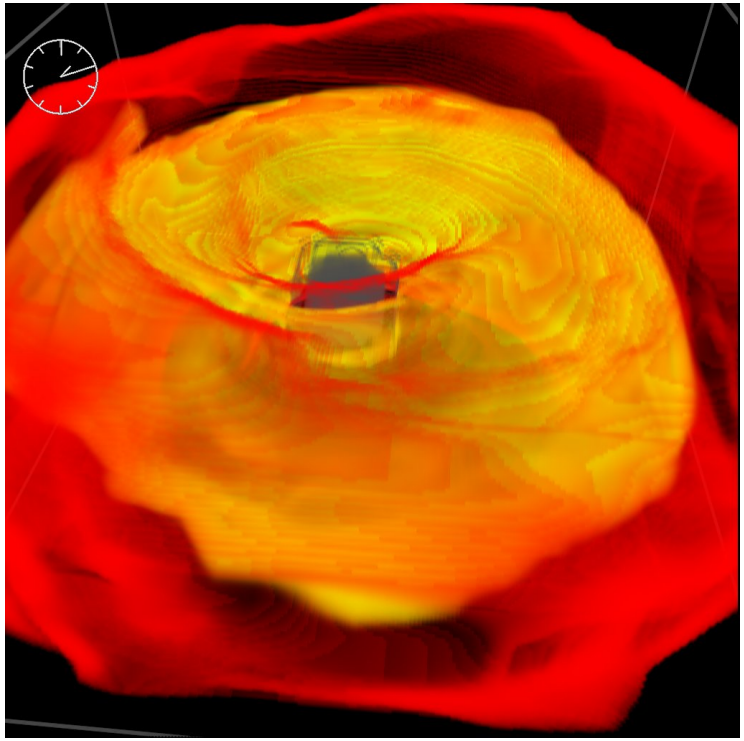

Summary

- Cooperation between developing and developed nations is essential for future growth of space science and technology
- HSTI is a useful initiative to foster co-operation between developing and developed nations in research and education

Thank You!