

ANNUAL REPORT ON THE 2010 POSTGRADUATE DIPLOMA COURSE IN SPACE SCIENCE AND TECHNOLOGY EDUCATION

It has become crystal clear that space science and technology (SST) is contributing significantly to human development and quality of life. To tap into the benefits of SST in the region (Anglophone countries), the African Regional Centre for Space Science and Technology Education in English (ARCSSTE-E), through the 9-month postgraduate diploma (PGD) programme, has continued to build capacity in four relevant aspects of SST applications; Remote sensing/GIS, Satellite Communications, Satellite Meteorology and Basic space and Atmospheric Science.

The 2010 PGD programme began with the screening of applications and the subsequent admission of 27 participants (three withdrew later) from eight Anglophone countries namely; Kenya (3), Tanzania (1), Uganda (4), Cameroon (2), Zambia (1), Botswana (2), Sudan (1) and Nigeria (14). A minimum qualification of a bachelor's degree or its equivalent from internationally recognized universities, relevant working/practical experience and geographical spread constituted bases for selection. The announcement/advertisement of the 2010 PGD programme was made through ARCSSTE-E's website, Embassies of member countries and various organization

STUDENTS' ORIENTATION

A week long orientation programme replete with educative, informative and entertaining activities was organized between the 18th and 24th of January, 2010. This was to ensure the proper integration of participants from the heterogeneous cultural milieus and to get them to acclimatize to the new environment. Some of the activities included;

- Meeting between the students and staff of the Centre
- A guided tour of the Obafemi Awolowo University Campus, the host institution
- Excursions to the famous Osun Groove and Olumo Rock
- Lectures on the culture and language of the Yoruba people of Southwestern states of Nigeria and African Culture and international relations skillfully expounded by professors from the host university.

Following the students' orientation was the opening ceremony which took place on 22nd January, 2010 at the Centre's premises. The occasion attracted very eminent personalities from within and outside the university environment and men of the press. The Director of the Centre, Dr. J.O. Akinyede in his opening remarks affirmed the Centre's resolve to build SST capacity in Africa and assured participants a fruitful and well packaged course. A talk on "Necessity for Inter State

Cooperation in Africa” was delivered by Prof. F. A. Fawole of the department of International Relations, Obafemi Awolowo University, Ile-Ife.



Participants on excursion to the famous Osun Grove



A guest lecturer delivering a lecture during 2010 opening ceremony



RECTAS's Director delivering his lecture at the opening ceremony



Members of the high table standing for the Botswana national anthem at the PGD opening ceremony



Participants during the 2010 opening ceremony

Between 23rd and 24th February, **2010** the international participants embarked on a 2- day familiarization visit to their embassies and high commissions in Abuja, The Nigerian federal capital. The trip also afforded the participants the opportunities of having a feel of the sight and sound of visiting Abuja.

Course commencement

Course lectures commenced earnestly on the 25th of January, 2010. During the first three months, **some fundamental aspects of the course** (Space law, Principle of Remote sensing, Remote Sensing platforms, Sensors and Ground Systems) were taught as common modules to all course options. This was designed to enable all participants acquire basic knowledge and understanding of space science and technology applications.

After the common modules the participants moved on to their respective course options for the core modules and applications.

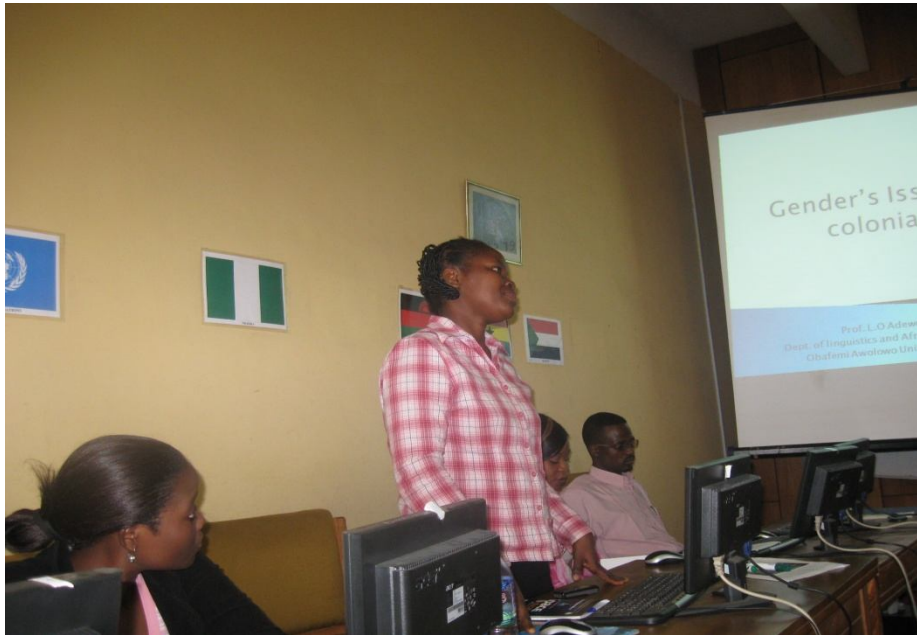
The lectures for the common and core modules ended in June and paved way for the PGD project work which began in July and ended in September. The project topics were chosen by the participants and reflected unique problem areas in their environment (organization, immediate

environment/community or country) that need to be addressed. The utilitarian value of the projects to the participants' environment was the focal point of the projects.

The project defence was organised on the 23rd September, 2010. The research projects served as further training for the participants on how to solve real life problems using the skills and education acquired during the training programme. The cost of printing, binding and supervision was borne by the Centre.

| S/no. | Project Topic | Course Option |
|-------|--|---------------|
| 1 | Analysis of Wetland Status. | RS/GIS |
| 2 | An Assessment of Urban Geo-Spatial techniques.(A case study of Arua municipal council-Uganda | RS/GIS |
| 3 | An Analysis of the Spatial Pattern of Sawmill Using Remote Sensing & G.I.S | RS/GIS |
| 4 | Geospatial Analysis of Surface Water Pollution from Automobile. | |
| 5 | Geospatial Analysis of Ground Water Quality in Ile-Ife | RS/GIS |
| 6 | Analysis of Road Transport Network Connectivity 7 Accessibility in Ife Central Local Government. | RS/GIS |
| 7 | Crime Mapping Analysis in Abuja using Geospatial Techniques. | RS/GIS |
| 8 | Multi Spectrum Analysis of Land use/Land cover Dynamic | RS/GIS |
| 9 | An Assessment of Potential tourist Site in Ile Ife | RS/GIS |
| 10 | Identification & Selection of Potential Child Day care Centers Using G.I.S in Ile Ife. | RS/GIS |
| 11 | An Assessment of the Physical expansion of AMAC, FCT Abuja Between 1987 @ 2001. | |
| 12 | An Overview of the Security of Satellite Videoconference Links | SATCOM |
| 13 | Effect of the Sun's Dark Side On the Stability and Reliability of Electric Power Systems | BSAS |

Table showing a few project topics



A participant presenting her work during the project defence

Resource persons with the requisite knowledge and expertise from the universities and other relevant institutions within the country were engaged to teach courses on a part-time basis. The Centre's regular staff assisted the resource persons as course instructors. Eclectic methods such as daily classroom lectures, seminars, computer-based training packages, group discussions and field trips were adopted. Each participant was assigned a computer and had access to all required software.

To enhance the programme quality, field trips were organized periodically. Some of the facilities visited were;

- Meteorological station at the Physics department, University of Ilorin for weather data analysis
- NITEL Satellite Station at Lanlate, Oyo State, to see its earth station operations
- Microwave Radar at the Physics department, Federal University of Technology, Akure,
- The RS/GIS lab at the Centre for Research and Applications, Federal University of Technology Akure (FUTA) to have practical experience on the operations of plotters and digitizers,
- Transmitters at the Nigerian Television Authority (NTA), Ile-Ife.



Participant on field trip the Federal University, Akure

The Centre created avenues and opportunities for participants to socialize, recreate and then learn new cultures. For this reason, the compact academic programme was punctuated at different times for excursions. The participants visited the famous Idanre Hills, Olumo Rock, the ever boisterous Lekki Beach located in Lagos, the nation's commercial/industrial headquarters and former federal capital. Other places visited during the period included the Erin-Ijesa Water Falls and Osun Grove

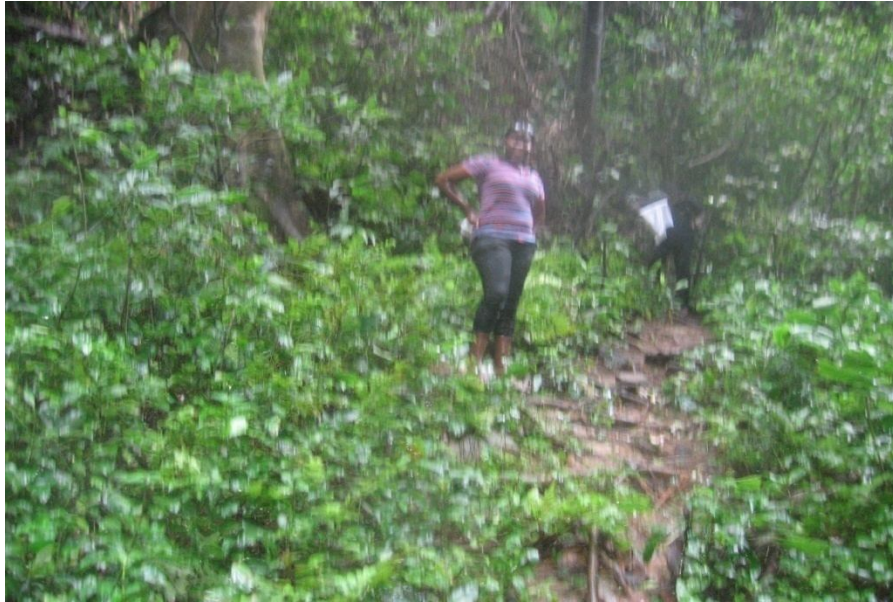
At the end of each module the participants were evaluated through formal written and practical examinations. The cumulative results from each module formed participants' overall grade point aggregate (GPA). Satellite Meteorology was not taught because of the low turnout of candidates.



Participants on excursion to Erin-Ijesa Water Falls



Participants on field trip for ground truthing



Participants on field trip for ground truthing



Participation at the Lekki Beach in Lagos



Participants at the Lekki Beach

As a way of encouraging international participation all international participants were offered full scholarship covering the tuition, hostel accommodation, medical services, course materials and projects and a monthly stipend of twenty thousand naira (N20, 000) per participant by the National Space Research and Development Agency (NASRDA). While The Travel tickets for the international participants were provided by the UN Office for Outer Space Affairs (UNOOSA), the institution that oversees the PGD programme.

On the 30th of September a graduation ceremony was organized at the Conference Centre of the Obafemi Awolowo University to mark the end of 2010 PGD course. The event which started at 10.00am was graced by officers from the University community including a representative of the Vice Chancellor, a representative of the Director of RECTAS, friends of the Centre, students and men of the press.

Speaking at the occasion, the Director of the Centre, Dr. J.O. Akinyede reiterated the Centre's resolve to continue to harness its resources to evolve ways and means of developing a critical mass of space science and technology scientists in Africa. He noted further that ARCSSTE-E has the requisite human resources and willpower to ensure that Africa, like the rest of the world, taps from these technologies to solve its peculiar socio-economic and environmental problems. He therefore called on the graduates to utilize the robust knowledge acquired from the training to impact positively on their societies.

The representative of the Vice Chancellor, Prof. F. A Adesina who is also the Course Coordinator for Remote sensing/GIS and Satellite Meteorology commended the Centre for its Altruism and vision. He enjoined the participants not to horde the knowledge acquired but rather dispense it for the good of their individual environments and Africa at large. He called on them to be good ambassadors of the Centre.

Some of the high points included the presentation of certificates, the formal declaration of end of session and a lecture tagged, “Time Management and Effectiveness” skillfully delivered by Prof. Ogunbameru.

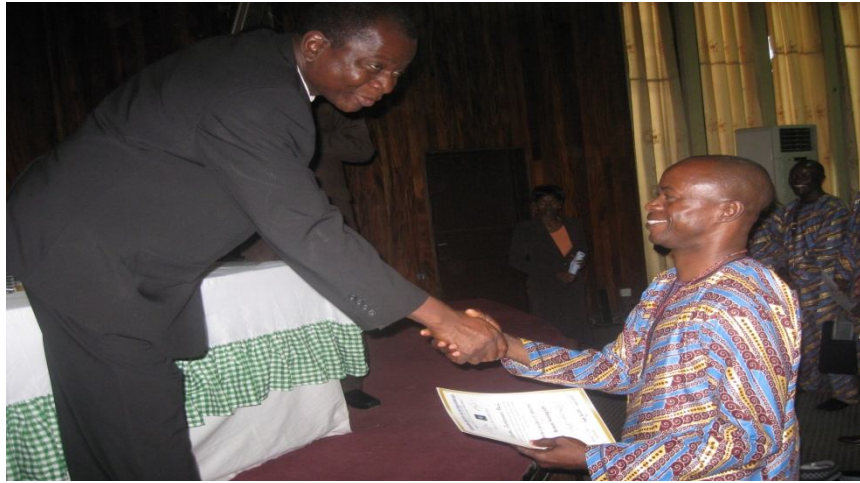
The 2010 PGD course was anchor by two course Coordinators



A cross section of the 2010 PGD participant at the closing ceremony



Participants having lunch after the graduation ceremony



A participant being presented with the PGD certificate by the Representative of the Vice Chancellor, Prof. F. A. Adesina



The Director, some resource persons and ARCSSSTE-E staff with the participants

Yearly distribution of participants since inception in 2000

| Session | RS/GIS | | Satcom | | | Bsas | | | Satmet | | | Grand total |
|--------------|------------|----|--------|-----------|----|------|-----------|---|--------|----------|---|-------------------|
| | M | F | M | F | | M | F | | M | F | | |
| 2000/2001 | 6 | 6 | - | - | | | - | | | - | | 6 |
| 2001/2002 | 4 | 4 | - | - | | | | | 4 | 4 | - | 8 |
| 2002/2003 | - | | - | 5 | 5 | - | - | | | - | | 5 |
| 2003/2004 | - | - | - | - | | | - | | | - | | - |
| 2004/2005 | 4 | 4 | - | 4 | 4 | - | | | | 3 | 3 | 11 |
| 2006 | 28 | 25 | 3 | 14 | 14 | - | 4 | 4 | - | - | | 46 |
| 2007 | 18 | 14 | 4 | 8 | 8 | - | - | | | - | | 26 |
| 2008 | 22 | 14 | 7 | 12 | 12 | - | - | | | - | | 34 |
| 2009 | 22 | 18 | 4 | 8 | 8 | - | 8 | 6 | 2 | 1 | 1 | 39 |
| 2010 | 20 | 15 | 5 | 4 | 4 | - | 3 | 2 | 1 | - | | 27 |
| TOTAL | 125 | | | 55 | | | 15 | | | 8 | | <u>202</u> |

Cooperation/collaborations

To strengthen capacity building in the area of SST, especially at the M.Sc level, the Centre is seeking collaborative efforts with relevant institutions. So far the Centre has signed a Memorandum of Understanding with the Federal University of Science and Technology, Akure (FUTA) and Regional Centre for Training in Aerospace Surveys (RECTAS). Plans are under way to collaborate with the department and Geography, Obafemi Awolowo University and other relevant institution within and outside the country.

International conference/ inauguration of ARCSSTE-E's Alumni

To further propagate the Centre's capacity building and to ensure institutional cooperation, the Centre organized the First ARCSSTE-E's Regional Conference with the theme "Engendering Pragmatic Development of Space Science and Technology in Africa, Prospect and Challenges" from 18th – 21st August, 2010. The conference was well attended by experts, researchers and policy makers, ARCSSTE-E's alumni as well as the 2010 participants. During the event, ARCSSTE-Es Alumni Association was inaugurated. An executive committee comprising the previous and 2010 participants was constituted. The main objective was to provide the alumni a platform to exchange ideas and experiences to enable them utilize the knowledge gained for the development of space science and technology in Africa.

CONSTRAINTS/CHALLENGES

(i) Paucity Funding

The major constraint of the 2010 PGD programme was poor funding. The PGD programme is being exclusively funded by the Nigeria government through the National Space Research and Development Agency (NASRDA). The success of an institution is a function of its financial strength and fluidity. The lack of it affective the programme in many ways than one.

(ii) Governing Board

The Governing Board, the highest policy making organ in the Centre's organogram is yet to be constituted inspite of the Centre's concerted efforts. The involvement of representatives of all participating countries in the running of the Centre's programmes would enhance the Centre's budgets and programmes.

(iii) Infrastructural/learning facilities

Library: The Centre until now does not have a functional library. This obviously had a limiting effect on participants' performance and the scope of research. A training programme of this magnitude needs a world class virtual and manual library. Though, the Centre had made efforts to acquire relevant software and materials for effective and efficient training, there is still room for improvement.

Inadequate office and lecture/training room accommodation to support the admission and training of more participants. The Centre for instance still shares office and class room accommodation with the OAU'S Department of Mathematics.

Hostel Accommodation: The 20 – room hostel accommodation for the participants is too small to accommodate the participants on the course. There is an urgent need to increase the number of rooms to accommodate at least 80% of the participants' population.

Inadequate enabling technologies especially Power supply and ICT. Presently, the Centre's internet facility is a sub-net of the University network which makes internet access at the Centre inefficient.

Vehicles: The fact that there are no dedicated vehicles for the PGD programme posed some challenges. To facilitate field trips, excursions and other tours the PGD programme needs dedicated vehicles.

RECOMMENDATIONS

- Library; A library should be built. This would afford the participants the opportunity to carry out more acceptable research projects.
- Efforts should be made to implement phase 2 of the education programme leading to award of MSc in partnership with Obafemi Awolowo University, Ile-Ife or any other University in the Centre's member states.
- Research activities should be given adequate attention (financial support) by the Centre in order to sustain the educational programmes.
- To improve performance in the implementation of the four PGD programmes, each programme should be run in partnership with existing institutions. For example, the PGD (Rs & GIS) can be run in partnership with RECTAS. This approach will facilitate education of more participants and also relieve the Centre of the extra burden of putting in place sufficient training facilities.
- The Centre should make effort to start running workshops for teachers of secondary and primary schools in the region as designed and envisaged by the UN. Support of UNOOSA will however be required in this regard to provide fellowship for participants for their travel and subsistence.
- The PGD participants should be encouraged to execute pilot projects in line with the UN mandate when they return to their home countries/organizations. The project should already be determined during their studies in ARCSSTE-E and measures put in place for follow-up supervision and guidance. It will be beneficial if the project can be designed such that it becomes part of the requirement for the award of MSc degree in partnership with a University, e.g. OAU, Ile-Ife.
- Agreement should be reached with NASRDA to make available to the Centre, data from NASRDA's Earth Observation Ground Receiving Station(s) and archives.
- In preparation for the take-off of the GNSS course, the agreement and MoU with RECTAS should include the use of the latter's Continuously Operating Reference Station (CORS).
- There is an urgent need to build capacity in-house. Over 80% of PGD funds goes for payment of honorarium to resource persons alone. The Centre relies mainly on external capabilities for the teaching of courses. Though training is a long term development plan, it will pay off in the long run. Staff in relevant disciplines should be encouraged to acquire higher education so as to function effectively in the teaching of courses.
- Participants should embark on more field trips so as to increase the practical base. Though field trips are expensive, the gains are enormous and cannot be quantified in monetary terms. The whole essence of the programme is about applying the knowledge

gained to address or solve real life situations. The field trips provide the opportunities for students to see things in their real natural forms

- Efforts should be made as quickly as possible to finalize the Agreement establishing the Centre and ensure that member states sign the agreement.

CONCLUSION:

Since 2000, the Centre through its 9- months PGD programme has conscientiously established a viable system to impart education and training in space science and technology to Anglophone countries. Each country in Africa requires a certain number of trained personnel in the area of space science and technology education to be able to use the specialized knowledge to address domestic problems and in the process reduce the reliance on external support. The efforts of the Centre in the 2010 PGD was therefore in line with this realization. Twenty (24) Africans from 8 countries with heterogeneous socio – economic and cultural backgrounds have been empowered with skills, knowledge and that will no doubt add value the African continent. In spite of the numerous challenges and setbacks the 2010 PGD programme was a huge success.

