

# **REPORT ON HANDS-ON BASIC SPACE SCIENCE TRAINING (HBSST) FOR PRIMARY AND SECONDARY SCHOOL SCIENCE TEACHERS 2017**

- a. OFFICIAL RESOURCE PERSONS:** 1. Esaenwi Sudum (PhD in View/Astrophysicist) 2. Prof. F.B. Sigalo (Astrophysicist), 3. Prof. R.N.C. Eze, (Astrophysicist), 4. J.U. Nwaffiah (PhD in View/Astrophysicist), 5. Shehu Suraju (Remote Sensing) and 6. Late Prof. F.E. Opara, Astrophysicist
- b. CO-OPTED FACILITATORS:** 1. Dr. C.N. Ofodum, (Astrophysicist), 2. Olubukola Adeoti (Astrophysicist) 4. Godson Abey (Astrophysicist), 5. Udonam-Inyang E, (Astrophysicist), 6. Justus Chukwunoyerem (Electrical Engineer). 7. Dr. B.I. Okere, (Astrophysicist)
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- d. PROCUREMENT:** 1. Mrs. Folape Falana (Electrical Engineer), 2. Mrs. Chinyere Okafor (Geography)
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- f. TECHNICAL COMMITTEE:** 1. Esaenwi Sudum (Astrophysicist), 2. Professor F.B. Sigalo (Astrophysicist), 3. Prof. R.N.C. Eze (Astrophysicist), 4. Dr. C.N. Ofodum (Astrophysicist), 5. Dr. B.I. Okere (Astrophysicist).
- g. LOC:** 1. Esaenwi Sudum, 2. F.B. Sigalo, 3. R.N.C. Eze, 4. C.N. Ofodum and 5. Adeoti Olubukola

**VENUES:** 1. Nsukka, Enugu State (NASRDA-Centre for Basic Space Science, Conference hall, Nigeria)

2. Port Harcourt, Rivers State, Department of Physics, Electronics Laboratory, Rivers State University RSU

**DATES:** Nsukka, 1<sup>st</sup> – 3<sup>rd</sup> June 2017

Port Harcourt, 5<sup>th</sup> – 7<sup>th</sup> June 2017

**PARTICIPANTS:** Nsukka, 31 Teachers (9 Females and 22 Males)

Port Harcourt, 40 Teachers and 32 actively participated first year Physics and Mathematics Students (28 Females and 44 Males)

**Total Participants:** 103 Teachers/First Year Physics Students

**Total Teachers:** 71 Teachers

**Total Active Participated First Year Physics Students: 32**

**Total Females: 37**

**Total Males: 66**

**Geo-Political Zones Partly Covered: 6**

**States Covered in Total: 36 and Capital territory**

**Number of College Student Participants (Not Recorded but photo shown): 7**

**Number of Galileoscope distributed: 7**

**Website:** <http://westafrica.astro4dev.org/pictures-from-hbsst-nsukka/>

**Link to photo gallery from HBSST Nsukka:** <https://sites.google.com/view/hbsst-nsukka/home>

**Link to photo gallery from HBSST Port Harcourt:** <https://sites.google.com/view/hbsst-port-harcourt/home>

#### **Overview of event:**

1. We recorded over 80 first year students of Physics and mathematics in attendance as indicated in the WhatsApp group, but here we chose to report on only the students who participated actively from beginning to the end of the workshop.
2. These first year Physics and Mathematics students were not captured in our budget and proposal but we suddenly discovered a willing set of upcoming scientists, hungry and passionate for Astronomy knowledge and development. In Rivers State University, Students of physics and mathematics are allowed to choose an area of specialization at third year after taking a general physics/mathematics courses for the first two years of their career.
3. We learnt about a new area to explore and extend our popularization to. Physics and mathematics department have different options which include Astrophysics option, but since it was established, the option have been bereaved/starved of willing students who wish to go into Astronomy due to lack of knowledge on astronomy and limited information on the Careers in Astronomy. The HBSST gave us significant breakthrough because after the program, the number of students that indicated to migrate into the study of Astronomy at third year frightened the few Astronomy Lecturers who testified that they may be unable to cope with the workload of supervision in the future due to limited academic staff in this field of study.
4. We have therefore discovered future lecturers/instructors of astronomers in this school and wish to extend similar popularization among first year students of physics, mathematics, chemistry, biology and Engineering in different universities of higher learning in the country, this I think is a new discovery for us here in Nigeria, and a serious improvement in Nigeria and African Astronomy if given the support and funding.

5. We successfully formed an Astronomy research group in RSU among willing students, with Prof. F.B.Sigalo as the coordinating Director of the group, the dean faculty of Science, head of Department of Physics and Other Academic staff of Physics and astronomy as member



The Director of Astronomy Prof. F.B. Sigalo, Dean Faculty of Science Prof. Omubo-Pepple B.V, and volunteered first year students of Astronomy at the formation of the Astronomy Group in RSU, Port Harcourt.

**DIGNITARIES IN ATTENDANCE:** Vice Chancellor RSU Prof. Blessing Didier, Represented by the DVC Prof. Oruwari, Dean Faculty of Science RSU Prof B.V Omubo-Pepple, Head, Department of Physics RSU, Prof. C. Isreal-Cookey, Coordinator Astronomy and Astrophysics RSU, Prof. F.B. Sigalo, Ag; Director NASRDA-Centre for Basic Space Science Nsukka, Dr. B.I.Okere, Head of Science NASRDA-Centre for Basic Space Science Nsukka Dr. C.N.Ofodum, Deputy Director Administration NASRDA-Centre for Basic Space Science Nsukka, Deputy Director Budget NASRDA-Centre for Basic Space Science Nsukka, Head of Department of Physics University of Nigeria, Nsukka, Deputy Director International Collaboration NASRDA-Centre for Basic Space Science Nsukka, Grant Holder HBSST, Esaenwi Sudum, and Director IAU/OAD, Dr. Kevin Govender.



Dr. Kevin Govender Delivering Professional advice via skype during HBSST



The V.C. RSU, Ag: Director CBSS and other dignitaries during the PH HBSST



The grant Holder HBSST, Esaenwi Sudum delivering a speech on purpose of workshop at Nsukka.

**PROJECT CARRIED OUT:** 1. Pre-assessment, 2. Stars and their Nature, 3. Stars, 4. Solar System, 5. Introduction to Astronomy and Space Science, 6. Careers in Astronomy, 7. Installation of Stellarium/distribution of materials on participants laptops, 8. Construction of small optical telescope using locally sourced materials, 9. Measuring the diameter of the Sun, 10. Observation of sunspot using solar-scope and small vixen brand equatorial mount refractor telescope, 11. Observation of the moon using David levy comet hunter small optical telescope, 12. Construction and launching of water rockets using locally sourced materials, 13. Construction of eclipse model and solar system models, 14. Demonstration on constellation

using universe in a box apparatus, 15. Site seeing of the NASRDA-CBSS observatory and facilities, 16. Site seeing of Rivers State university of Science and Technology research facilities, 17 use of the Dome, 18. Small Optical telescopes, 19. How High is Space, etc.

**COLLABORATORS:** NASRDA-Centre for Basic Space Science, Nsukka, International Astronomical Union/Office of Astronomy for Development IAU/OAD, West African Regional Office of Astronomy for Development WAROAD, Rivers State University RSU, University of Nigeria UNN, and Young Scientist Centre YSC.



The collaborators are as indicated on the Banner

### METHODOLOGY:

HBSST workshop is the first Astronomy program in Nigeria which is Hands-on. The program had positive tremendous impact on the participants because it translated Astronomy which studies distant objects into practicable and visible reality bringing those distant objects closer to them in simple terms via descriptive teaching approach and inquiry based method of teaching, thus exciting the teachers and every other young minds into the quest for more. HBSST was designed to promote astronomy appreciation for primary and secondary school science teachers in Nigeria and to bring the basic observational tools of Astronomy and space science closer to them. This teacher hands-on training workshop was successfully organized to hold in two Centers namely, Nsukka in Enugu State of Nigeria, located in the South-East Zone (1<sup>st</sup> – 3<sup>rd</sup>) of June 2017 and Port Harcourt in Rivers State of Nigeria, located in the South-South zone of the country on (5<sup>th</sup> – 7<sup>th</sup>) of June 2017 respectively. These two Centers were chosen to bring the workshop closer to participants from various Schools in all six geo-political zones of the country. A total of 40 teachers were accepted to attend the workshop at each center to make an overall total of 80 teachers to be trained.

In Nsukka, Enugu State, the Workshop was held at the NASRDA-Centre for Basic Space Science Nsukka conference hall with the Ag: Director, Deputy Directors and all Assistant Directors of the Space Agency Present to witness the opening ceremony. The welcome address

was given by the Assistant Director of Administration NASRDA-CBSS Mr Ogorbor, key note address was read by the Ag: Director, Dr B.I.Okere, Professional advice by Dr. Kevin Govender, while the workshop was declared opened by the Head of Department of Physics and Astronomy, represented by Prof. Chukwude A.E. At the Opening ceremony of the event only 23 teachers were present while others joined up shortly after the opening event. Day one of the program in Nsukka recorded a total of 25 teachers and an overall total of 31 teachers comprising of 9 females and 22 males on the rest of the event. The event ended with a closing ceremony, donation of Galileo-scope to best participating teachers, and teachers who travelled about 500km and above to the program and issuance of certificates to all participating teachers.

In Port Harcourt, Rivers State, the Workshop was held at the Rivers State University (RSU) Department of Physics Electronics Laboratory, with the Vice Chancellor represented by the Deputy Vice Chancellor (Prof. Oruwari Boma), Dean Faculty of Science (Prof. B.V. Omubo-Pepple), Head Department of Physics (Prof. C. Israel-Cookey) Head of Astronomy RSU (Prof. F.B.Sigalo), Ag: Director of CBSS (Dr. B.I. Okere), Head of Science (Dr C.N Ofodum) all Present to witness the opening ceremony. The welcome address was given by the Ag: Director Dr. B.I. Okere, key note address was read by the Head of Astronomy RSU, Prof. Fb. Sigalo, Professional advice by Dr. Kevin Govender, while the workshop was declared opened by the Vice Chancellor RSU. at the Opening ceremony of the event about 30 teachers and over 30 first year students of physics department were present with enthusiasm to gain astronomy knowledge while others joined up shortly after the opening event. The program in Port Harcourt recorded a total of 72 actively participated teachers and first year students, comprising of 28 females and 44 males. The event ended with a closing ceremony, donation of 6 Galileo-scope to best participating teachers, and issuance of certificates to all participating teachers and first year students of Physics.



The Vice Chancellor represented by the Deputy Vice Chancellor (Prof. Oruwari Boma), Dean Faculty of Science (Prof. B.V. Omubo-Pepple), Head Department of Physics (Prof. C. Israel-Cookey) Head of Astronomy RSU (Prof. F.B.Sigalo), Ag: Director of CBSS (Dr. B.I. Okere), Head of Science (Dr C.N Ofodum) and Grant Holder Esaenwi Sudum (on Bow Tie)



Teachers and first year Physics/Mathematics students receiving Astronomy Lectures HBSST at PH



The Ag: Director Dr. B.I.Okere, Deputy Directors, all Assistant Directors of the Space Agency, Head, Department of Physics and Astronomy, represented by Prof. Chukwude A.E. and some Teachers at opening ceremony, Nsukka

The workshop started with a pre-assessment and ended up with a post-assessment, whose result showed that there was a geometrical increase in Astronomy awareness amongst the teachers. There were Three main session of the workshop namely; Lecture session, Technical session and Observatory tour



Pre-assessment session during HBSST at PH

### LECTURE SESSION:

This session was handled by Prof. F.B Sigalo (Stars and their Nature), Prof. Romanus Eze C (Stars), Dr. B.I. Okere (Solar System), Dr. C.N. Ofodum (Introduction to Astronomy and Space Science), Nwaffiah, J.U. (How High is Space) and Esaenwi S (Careers in Astronomy).

These lecture sessions lasted for an hour each on day one of the program to build the foundation of the participant of the remaining programs of the workshop.



Dr. B.I.Okere, delivering lecture at PH



Prof. F.B. Sigalo delivering lecture at PH



Dr. C.N. Ofodum delivering lecture at PH



Professor Romanus Eze delivering lecture at Nsukka



The Grant Holder; Esaenwi Sudum, and teachers constructing water rocket launcher at Nsukka

### **TECHNICAL SESSION:**

The Technical session covered Installation of Stellarium/distribution of materials on participants laptops, Construction of small optical telescope using locally sourced materials, Presentations, Observation of sunspot using solar-scope and small vixen brand equatorial mount refractor telescope, observation of the moon using David levy comet hunter small optical telescope, construction and launching of water rockets using locally sourced materials, construction of eclipse model and solar system models, demonstration on constellation using universe in a box apparatus, etc. Teachers were divided into four working groups of 10 each for convenience.



Godson Abey during optical telescope construction and sunspot observation in PH



Teachers and first year students constructing small optical telescopes during technical session of HBSST at PH



Engineer Justus constructing the eclipse demonstration model during HBSST at Nsukka



Teachers and first year students constructing water rockets during technical session of HBSST in PH and Nsukka



Teacher observing terrestrial objects and the moon during sunset with an optical telescope during technical session of HBSST at Nsukka



Observatory tour with Dr. Ofodum using a small dome, optical telescope and solarscope at Nsukka



Observatory tour with Dr. Ofodum on a small dome, optical telescope and solarscope at Nsukka

### **OBSERVATORY TOUR:**

This session covered site seeing of the NASRDA-CBSS observatory and facilities, the Rivers State university of Science and Technology research facilities. These facilities include the Dome, small Optical telescopes, NECOP stations, Small radio telescope dish under construction, etc.



Suraju with Teachers using optical telescope and studying a small dome during technical session of HBSST at Nsukka

**The following were achieved during the workshop;** We upgraded the skills, teaching tools and aids of the teachers, equipping them with innovative and simple method of teaching and learning. The teachers were also trained to use Basic Space Sciences activities as a teaching tool for their subject's concepts. The course material which include Astronomy based activities and hands on science/astronomy using low cost/locally available material were procured and distributed to teachers for their practice at no cost to them.

**The HBSST Project after a successful conclusion achieved the following goals:**

- (i) Successfully trained Primary and Secondary School Teachers from selected schools in all Six Geopolitical Zones in Nigeria who will in turn supervised to train others and their students thus the chain will continue
- (ii) Successfully Spread scientific awareness on "Astronomy", popularizing space science through outreach programs among Nigerian primary and secondary school teachers and first year physics students among who we will continue to update with any Astronomical events like eclipses, solar Halo, meteor showers, meteorite falls, etc before they happen as well as popularizing various activities of the IAU among them and their schools and colleges in Nigeria.
- (iii) developed Academic Astronomy Materials like articles, Galileo scopes, models etc, and making them available to the Teachers, schools and colleges for their classroom presentation at no cost.
- (iv) Formed an active Astronomy Instructors-Science Teachers Forum in different schools and colleges in Nigeria for Space learning and popularization continuity.
- (v) Promoted widespread access to the universal knowledge of astronomy through the excitement of astronomy proper use of internet to transmit Astro Knowledge across all Teachers, Schools and Colleges in Nigeria.
- (vi) Promoted knowledge on the preservation of our global cultural and natural heritage of dark skies through the awareness of observation of the night sky using simple locally made optical telescope.
- (vii) Strengthened the existing networks of Astronomers by connecting these Teachers to the network of amateur astronomers, educators, scientists and communication professional through local, regional, national and international activities by adding them to the HBSST WhatsApp group and email list of professional Astronomers.
- (viii) Supported and improved formal and informal science education among teachers in Nigerian primary and Secondary Schools.
- (ix) Promoted collaboration between teachers in Primary/ secondary schools and Astronomers in the university of Higher learning in Nigeria to enhance various astronomical activities and observational facilities involving the schools, colleges and universities.
- (x) strengthened teachers and first year physics students' knowledge in basic Space science and Astronomy.
- (xi) Help teachers to learn new methods of communicating astronomy and other science subjects to their students using inquiry based method and descriptive teaching approach. Etc.

- (xii) Helped first year students of physics to diversify their career in physics and migrate into space science and astronomy studies.
- (xiii) Formed an active Astronomy Research Group in Rivers State University
- (xiv) Partnering with the Astronomy Research group in the University of Nigeria, Nsukka

**TESTIMONY:**

All participants were happy with the conducive teaching and learning environment offered to them during the workshop. All lectures were channeled towards the development of Astronomy and space science in all schools represented. Teachers and students all demanded that the HBSST should be extended to hold in the Northern and Western part of Nigeria next year since Nigerian has a population of about 200,000 million people which we intended to cover with these popularizations. Other teachers requested that the HBSST should be held at least after every two years because its tremendous benefits are first of its kind.

IAU/OAD was wholeheartedly thanked by the V.C, the university community, all teachers and students, and all collaborators.

More testimonies are attached in video format on the website link



A teacher giving a vote of thanks at the closing ceremony of the workshop in PH

A Teacher also brought Science students from his college to come and benefit from the workshop, although these young students were not officially registered, they participated fully in the workshop thus they were feed and issued certificate and a Galileoscope as well.



Some college students who participate at the HBSST in PH



College students observing with the vixen brand equatorial mount refractor optical telescope in PH

## CERTIFICATES AND PRIZE DONATION:



Some Teachers receiving certificates and Galileoscope during HBSST closing ceremony



Certificate sample



At the end of the workshop certificates were issued to participants at Nsukka and Port Harcourt respectively. We also distributed some Galileoscope to best participating teachers and schools represented.

Photo Gallery on HBSST



Eclipse Demonstration model session



Closing Ceremony Group Photo at Nsukka



Water rocket building session at Nsukka



Preparation for water rocket launch at Nsukka



Preparation for water rocket launch at Nsukka



Preparation for water rocket launch at Nsukka



Moon sighting session at Nsukka



Eclipse Demonstration Model session at Nsukka



Measuring the angular distance of the Sun at Nsukka



Sunspot observation using solarscope at Nsukka



Star Lecture Session at Nsukka



Certificate issuance session at Nsukka



Indoor Technical session at Nsukka



Observing with 15cm refractor optical Telescope at Port Harcourt



Optical telescope construction session in Port Harcourt



College students participating in Construction session at PH



Optical Telescope construction session in PH



Best participating teachers award in PH



Best Participating Teacher award in PH



Best participating Teacher award in PH



Technical Session in PH



College students and their teachers in PH



College students and some instructors



Technical Session in PH



Keynote address by Prof. F.B.Sigalo

#### **LIMITATION ENCOUNTERED:**

1. Nigeria has a population of over 200, 000 million people among whose over 5 million are teachers with Astronomy tasty first year students and PG students too, we need stronger continuous science campaign to reach them.
2. High cost of hosting the program
3. We received more application than requested, thus many teachers and student came to the program uninvited due to the testimony of their colleagues and their quest for Astro-knowledge, we therefore had an over flood of participants on the remaining days of the program.
4. Universities and college Students in Nigeria are willing to study Astronomy if reached and given the awareness thus we had more of these categories of attendance uninvited

#### **RECOMMENDATIONS:**

1. We need to sustain the high interest of Astronomy and space science among these teachers and newly found first year physics and college students who are carriers of Astronomy knowledge, thus, we propose continuity of the HBSST

2. We suggest that IAU/OAD would take the HBSST serious so as to tap into this large economy of interested Nigerians by issuing a further grant to follow-up this training in the Northern and Western Part of the Country.

3. We have discovered that greater percentage of Nigerian first year students of Physics, Mathematics, and perhaps Engineering, Biology and Chemistry are passionate and enthusiastic about the study of Astronomy but lack the knowledge of its prospect and values economy wise and thus needs the awareness of Astronomy so as to develop this untapped area of science, to bridge the gap between research and technology in Nigeria and Africa.

4. We Have Passionate female teachers from secondary schools who have been trained by HBSST and we wish to add them to the team of instructors during subsequent workshop to encourage female participation in Astronomy programs in Nigeria if further support is approved.

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### LIST OF REGISTERED PARTICIPANTS IN HBSST 2017 AT ENUGU AND PORT

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### **FUNDING:**

Total Project Budget: 14956 EURO

Total Fund Received from IAU/OAD: 7019.05USD

1USD = 306 NGN (Central Bank of Nigeria, CBN)

Total Funding Received in Naira @ NGN 306:1USD = 2,147,829.3 NGN

### **BUDGET:**

**Type of Accommodation for Teachers = Shared (2 per room)**

**Type of Accommodation for instructors (1 per room)**

1. Accommodation of 6 Resource persons during workshop in Rivers State University

Guest House Port Harcourt @ 12,000 NGN/Night = 72,000 NGN. (3 Nights) = 216,000  
NGN

2. Cost of accommodation on 13 rooms for 25 Teachers coming from outside the host

location in Port Harcourt @ 10,000 NGN/night = 130,000 NGN, for 3 nights = 390,000  
NGN

3. Cost of accommodation on 11 rooms for 22 Teachers coming from outside the host

location in Nsukka @ 10,000 NGN/night = 110,000 NGN, for 3 nights = 330,000 NGN

4. Accommodation of 6 Resource persons during workshop at NASRDA-Centre for Basic Space Science, Nsukka = 0.00 NGN
5. Feeding 6 Resource Persons/Technical facilitators during workshop in Port Harcourt at 1500 NGN per meal;
  - i. Arrival Night Dinner 6 meals
  - ii. Day 1: 18 meals (Breakfast, Lunch and Dinner)
  - iii. Day 2: 18 Meals (Breakfast, Lunch and Dinner)
  - iv. Day 3: 12 Meals (Breakfast and Lunch)
  - v. Total = 54 meals X 1500 = 81,000 NGN
6. Feeding 40 Teachers during workshop in Port Harcourt at 1500 NGN per meal;
  - i. Arrival Night Dinner 17 meals (17 teachers signed into already booked hotels room)
  - ii. Day 1: 120 meals (Breakfast, Lunch and Dinner)
  - iii. Day 2: 120 Meals (Breakfast, Lunch and Dinner)
  - iv. Day 3: 80 Meals (Breakfast and Lunch)
  - v. Total = 337 meals X 1500 = 505,500 NGN
7. Feeding 6 Resource Persons/Technical facilitators during workshop in Nsukka at 1500 NGN per meal;
  - i. Arrival Night 0 Meals

- ii. Day 1: 18 meals (Breakfast, Lunch and Dinner)
  - iii. Day 2: 18 Meals (Breakfast, Lunch and Dinner)
  - iv. Day 3: 12 Meals (Breakfast and Lunch)
  - v. Total = 48 meals X 1500 = 72,000 NGN
8. Feeding 40 Teachers during workshop in Nsukka at 1500 NGN per meal;
- i. Arrival Night Dinner 23 meals (23 teachers signed into already booked hotels room)
  - ii. Day 1: 120 meals (Breakfast, Lunch and Dinner)
  - iii. Day 2: 120 Meals (Breakfast, Lunch and Dinner)
  - iv. Day 3: 80 Meals (Breakfast and Lunch)
  - v. Total = 343 meals X 1500 = 586,500 NGN
9. Stationeries
- i. 80 file Jackets @ 150 NGN per 1 = 12,000 NGN
  - ii. 2 Packets of Pen @ 1000 NGN per pack = 2,000 NGN
  - iii. 4 Metre rule at 70 NGN per 1 = 280 NGN
  - iv. 2 packs of A4 printing papers @ 1,450 NGN per pack = 2,900 NGN
  - v. 10 sheets of Cardboard paper @ 50 NGN per sheet = 500 NGN
  - vi. 2 Stapler @ 450 NGN per 1 = 900 NG
  - vii. 2 packs of razor blade @ 100 NGN per pack = 200 NGN

**Total cost: 2,148,980 NGN**

**Other cost not Covered by IAU/OAD Funding**

1. Workshop items 2. (Workshop materials, e.g. Lenses and PVC pipes for constructing telescopes, materials for constructing eclipse models, materials for constructing water rockets, materials for constructing solar system models, materials for constructing small radio telescopes, stationeries, tags, printing, etc.)
2. Local transportation of teachers and instructors from Bus station to Hotels and from hotels to workshop venue
3. Production and Printing (e.g., Posters, Banners, etc.)
4. Media Publicity (e.g. Radio) and Distribution of Invitation Letters to Vice Chancellor, Dean of faculties, Head of Departments, Principals of Schools, etc.
5. Administration and support cost (e.g. Phone, fax, mobile internet etc.)
6. Travel to Initially meet with college management, ministry of education, Directors of Post Primary School boards and attend LOC meetings (Total of 4 trips) total of 2000km on 3 representatives
7. Subsistence to initially meet with college management, Ministry of education, Directors of post primary School Boards and attend LOC Meetings on 3 representatives
8. Event Cost on Opening /Closing Ceremony (Interior Decorations, Drinks, Water, Public address system hire, projector, screen etc.)
9. Transportation of 6 Resource persons from Nsukka to Port Harcourt by road

10. Transportation of 6 Resource persons from Port Harcourt on road back to Nsukka by road
11. Transportation of workshop materials (Small optical telescopes, Practical session materials, Universe in a box tools, etc)
12. Feeding of participating University students, college students, coopted technical facilitators, college students and all other protocol officers
13. Honorarium for instructors

**Acknowledgement:** We sincerely thank IAU/OAD for their Initiative in African Astronomy Developmental, willingness and support in Issuing the HBSST grant and their love for capacity building and the development of Astronomy in Africa. Special Thanks to Dr. Kevin Govender for his love, time and effort towards the success of HBSST, our regards to Ramasamy Venugopal for his patience, kindness and assistance in all areas leading to the success of HBSST, we also wish to thank the Rivers State University Port Harcourt, University of Nigeria Nsukka, Young Scientist Centre and West African Regional office of Astronomy for Development, for their support and funds, best regards to all resource person who gave their time and knowledge to teaching Teachers and students.

**N/B:** NASRDA-Centre for Basic Space Science, Nsukka and the Rivers State University had promised support funding for HBSST to continue in Nigeria for proper awareness of Astronomy and development of future indigenous researchers, lecturers and professionals in the field of Astronomy by training young interested Teachers and Students. We pray IAU/OAD to continue the Support of HBSST.

**ESAENWI SUDUM**

GRANT HOLDER: Hands-on Basic Space Science Training workshop for Primary and Secondary School Science Teachers in Nigeria (HBSST)

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