

**POC Presentation in the 3<sup>rd</sup> UNISEC-Global Meeting**

**POC Abstracts**

## Space Education activities in Angola

Zolana Rui Joao<sup>1</sup>,

<sup>1</sup>Angolan National office for space affairs, Angola  
[zolana.joao@ggpen.gov.ao](mailto:zolana.joao@ggpen.gov.ao)

**Keyword :** Keyword list (Space Education, Seminar, MIC3, MIC4, CLTP6, Satellite, ANGOSAT)

The space activity is an important and powerful tool to support the large number of public policy objectives, providing international influence, prestige and sovereignty, security and support prevention and disaster management, environmental monitoring and protection, increasing scientific knowledge and economic development.

In Angola, space policy is being established with the main objective of enabling the country to develop and use space technologies in solving national problems and for the benefit of Angolan society.

As a response to that, since the year 2002 onwards, the country has been engaged in the process of launching the first National communications satellite ANGOSAT.

On this basis, it stands as one of the priorities the promotion of training, captivation and framing of specialists in order to boost national space activities.

The participation in the Third Mission Idea Context (MIC3), organised by UNISEC, was one of the tools used to promote such space education in Angola, by promoting the use of Micro and picosatellites for small projects that can be easily made in educational projects.

The use of micro and picosatellite for educational purpose and their application in the society, was demonstrated through a Regional Seminar held during the Angolan EXPO for ICT, one of the biggest expositions of new technology. Over 200 people from high school and University Students, Military officers, Business people and visitors coming from different fields and areas of expertise gathered around our stand to listen to the seminar about the MIC3 and the Can sat and pico satellite technology as figure 1 shows.

Another Seminar to promote Space education in Angola was on Opportunities for capacity building programs in the area of Engineering and Space Technology, where speakers from UNISEC, TSTI and Kyushu Institute of Technology shared their experience on capacity building in space programs to a total of 95 participants, from Investigators, Technicians of different fields, Administrators, Chief Executive Directors, Teachers and Students. as figure 2 shows.

The Fourth Mission Idea Context (MIC4) and the Sixth CanSat Leader Training Program (CLTP6), organized by UNISEC, were also some of the activities Angola engaged on, in order to promote capacity building in the space technology and promote teaching methods utilized in space engineering, where 23 applicants from more than 10 Universities and Higher Institutes have applied for such programs.



Fig 1. Seminar on Micro and Pico satellite and MIC 3



Fig 2- Opportunities for Capacity building in Space programs Seminar with TSTI, KYUTECH and UNISEC

Being new in the space programs Angola faces some difficulties concerning the lack knowledge and awareness of Space Technology, lack of human and technical resources, study materials, such as books

and articles related to space Technology, lack of training facilities and language barrier as not many people speaks English fluently.

These opportunities to participate in such activities and space programs will therefore help in preparing our future operators and managers of the first Angolan communications satellite ANGOSAT.

## **An Update on Space Activities in Australia – A Country Report for the 3rd UNISEC Global Meeting**

Australia/Asia Pacific

Naomi Mathers<sup>1</sup>, Sean Tuttle<sup>2</sup>

*1ANU Advanced Instrumentation and Technology Centre, Australia; 2UNSW Canberra, Australia*

[naomi.mathers@anu.edu.au](mailto:naomi.mathers@anu.edu.au)

[S.Tuttle@adfa.edu.au](mailto:S.Tuttle@adfa.edu.au)

**Keyword:** satellite, CubeSat, test and evaluation, training

Space activities in Australia continue to increase and the number of Australian universities supporting space engineering and science research is growing accordingly. This report will provide a summary of the major activities in Australia and some of the emerging opportunities.

In July 2014, the Minister for Industry, Hon Ian Macfarlane, officially opened Stage two of the Advanced Instrumentation and Technology Centre (AITC) at the Australian National University. The AITC is supporting the development of an instrument and the adaptive optics sub-system for the Giant Magellan Telescope, the test of the Australian Plasma Thruster and the test of CubeSats for the Defence Science and Technology Organisation (DSTO) and the Australian QB50 teams.

In addition to providing critical infrastructure for test and evaluation, the AITC is pleased to support the establishment of Nanosatellite Environmental Test Standards. Thanks to the efforts of Prof Mengu Cho, ISO/CD/19683 Design Qualification and Acceptance Tests of Small-scale Satellite and Units Seeking Low-cost and Fast Delivery has passed and ISO/TC20/SC14 Space Systems and Operations is under development. The development of these standards, and adhering to them, is important for maintaining safe access to the space environment for all users.

Another activity that is important for promoting the responsible use of the space environment is the delivery of quality training programs and access to hands-on experience. The AITC has provided professional training in optical design and vibration test and analysis. In early 2016, it will offer an introduction to satellite integration and test for groups in Australia establishing their own CubeSat programs. The AITC is also expanding its internship program to include summer interns and six month academic placements.

In December 2014 the AITC hosted a workshop to define Australia's next space-based astronomy mission. The workshop brought together astronomers and engineers to identify missions that would make a valuable contribution to the research interests of Australian scientists within the constraints of the CubeSat platform. It also attracted researchers developing the technologies that will expand what is possible in future CubeSat missions. Of the ten concepts presented at the workshop, three were selected for conceptual design, and the Australian Space Eye Telescope progressed to a full proposal currently before the Australian Research Council.

The AITC is also home to the Space Environment Research Centre (SERC). The SERC was officially launched in December 2014 as a collaboration between government agencies, universities and industry from Australia, USA and Japan. It draws on the research efforts of ANU in adaptive optics for observing smaller space debris more accurately, and RMIT University in developing models for reliably propagating the orbits of space debris in the variable space environment to predict potential collision events for satellite operators.

The University of New South Wales (UNSW) Canberra is also expanding its space activities, with a \$10M investment over the coming years to strengthen its space research activities and develop a sustainable university-led programme to undertake research in space. Amongst others, a capability is being established to routinely conceptualise, develop and fly affordable, responsible, in-orbit missions to perform research in space. These in-orbit missions will enable the development of innovative new technologies for spacecraft, including distributed, networked experiments and sensors across formations, swarms and assemblies of cubesats. Two technology development projects are already underway in collaboration with a large, European space company. Significant work has also gone into the establishment of space simulation

facilities to support the research activities and the establishment of a ground station in anticipation of the flight activities. These facilities will complement the already significant capabilities of the AITC, also in Canberra, thus providing a valuable enabling resource in the national capital. Finally, it is also worth mentioning the recently inaugurated optical telescope on campus which is linked into the international Falcon Telescope Network for observing space objects.

UNSW Canberra offers two Masters programmes, one in Space Engineering and one in Space Operations. These are aimed at increasing Australian knowledge and understanding of space activity in general, as well as specifically developing the skill-sets within the professional sectors which may need them. To enable flexibility to those learning, the courses are available in both the intensive (face-to-face) and distance (online) modes of delivery.

UNSW Canberra began active participation in Unisec activities with a presentation as a mission idea developer in the pre-MIC3 in November 2013. This led to a small student team working on the mission idea through 2014 and culminated with achieving second place in Unisec's 3rd Mission Idea Contest out of a total of 19 entrants worldwide. UNSW Canberra plans to continue this involvement and currently has an entry in the pre-MIC4.

UNSW is one of four Australian universities participating in the European Union QB50 program. UNSW, The University of Sydney and a collaboration between The University of Adelaide and The University of South Australia, are building three QB50 satellites. These will be tested toward the end of 2015 ready for launch in 2016.

The ANU and UNSW are working closely with the ACT Government to ensure that industry and academia are working together to sustain and grow these activities. In their 2015 Business Development Strategy the ACT Government announced the establishment of ACT Space Innovation Cluster. This Cluster will be headquartered at the AITC and link activities at UNSW Canberra, the Canberra Deep Space Communication Complex, Geoscience Australia, and companies such as Lockheed Martin Space Systems, Northrop Grumman and Airbus Defence & Space. This Innovation Cluster will also provide a focus for national and international collaboration.

In October 2014, Adelaide was announced as the host of the 2017 International Astronautical Congress, and UNSW Canberra and ANU have recently been selected to host jointly the 2018 Nano-Satellite Symposium in Canberra. These conferences provide an opportunity to share information and explore new opportunities.

The aims of the UNISEC Global initiative are well aligned with that of Australian universities, providing an excellent opportunity to increase international collaboration and opportunities for students. In March 2014, The Secretary General of UNISEC Global, Rei Kawashima, visited Australia to visit some of the universities active in space engineering and discuss the possibility of establishing a UNISEC Global Chapter in Australia. This visit was enthusiastically supported by the Australian universities. Following on from this, UNSW Canberra and ANU are looking at the most suitable way of embracing the UNISEC Global movement. It is likely that a workshop will be held in August 2015 in order to progress the initial concept for participation and to establish some concrete steps forwards.

In summary, there is a definite momentum in space activities in Australia and some of these are now moving from the traditional situation, where activity is almost entirely ground-based, to the attainment of in-space activity by a number of different organisations around the country.

## UNISEC-Bangladesh; Journey towards satellite research

Country: Bangladesh

Md. Khalilur Rhaman

BRAC University, Dhaka ,Bangladesh.

[khalilur@bracu.ac.bd](mailto:khalilur@bracu.ac.bd)

**Keywords:** Cansat, nano satellites, human resource development, UAV

Small Satellite development is one of the very interesting & popular research field now a days and Bangladesh is also interested on Small Scale Satellite research and development. UNISEC-Bangladesh idea was proposed at the 2<sup>nd</sup> UNISEC Global meeting at Kitakyushu, Japan. Our target is to build our own satellite within 2019. We are on our very first step to research space systems. We are currently building our Human resources to develop our own satellite. With that goal in mind, two of our undergraduate students recently completed their 6 months research on various areas of space system development at Kyushu Institute of Technology, Japan. As a result of this training, they developed their understanding on Small Satellites. Now, they are promoting and encouraging other students of the country to study space systems. We are considering this as the first step towards building a research team who will contribute in development of Nano Satellites.

From our recent findings we have come to realize that, Bangladeshi students can readily work on communication and control systems of Small Scale Satellites, if they are provided with proper guidance. Therefore we are now focusing our available educational resources on satellite communications and control. To encourage students on these research topics, CANSAT provides an excellent project based approach. We are now in middle of formulating a yearlong plan which will provide our students abundant opportunity to get involved with space studies.



**Figure 1 : Two student from Bangladesh in front of LASEINE at KIT JAPAN.**

To understand more and take up the challenges in this field we need more knowledge and for this in future we will send the students in different international institute for their higher studies on space system development. We are heading towards collaboration with international institute in different countries. We will participate this year at Cansat Leadership training program (CLTP) for learning more on design development of satellite.



**Figure 2 : Remote Sensing Based Quad copter**

Developing a remote sensing platform has always been one of our prime objective in order to assist our agricultural research community. Before implementing our own algorithm on a Small Satellite, our target is to test everything on UAV. As a first step of this, a target was set to test our modified UAV structure to be completed on 26th March, 2015, Independence day of Bangladesh. We are very happy to share with you, we have successfully completed our first test flight of our modified structure, this year on our Independence Day.

To further promote and encourage the young enthusiastic students, recently a seminar was arranged, titled "Initiation in Nano satellite technologies; you could be next!". Key speakers for this seminar were Prof. G.M. Tarekul Islam, POC, UNISEC-Bangladesh, Mr. F.R. Sarker. General Secretary,

Bangladesh Astronomical Society and myself. Two Students who participated in the student exchange program earlier this year at Kyushu Institute of Technology shared their experience with other students of BRAC University. Hopefully, this will inspire a lot more students to study space science. In order to build collaboration of Space Science And Engineering we already Invited Mr. Tilok Kumar Das from Chittagong University of Engineering and Technology to spread the message of UNISEC-Bangladesh in Chittagong. We are discussing with Bangladesh Space Research & Remote Sensing

Organization (SPARSO) to initiate a research collaboration, which will greatly benefit both parties. Some members of UNISEC-Bangladesh will participate in 2015 University Rover Challenge which



**Figure 4 : URC Competition 2015 (Work in progress)**



**Figure 3 : Seminar on Initiation in Nano Satellite Organised by Robotics Club of BRAC University in collaboration with UNISEC-Bangladesh**

is the world premiere robotics competition for the students. It will be held on Mars desert Station (MDRS) near Hanksville, Utah in the United States. We also created Facebook page of UNISEC-Bangladesh and our website is under construction ([www.unisec-bd.org](http://www.unisec-bd.org)).

The presentation aims to report recent activities development in Bangladesh regarding space research, outreach activities, international collaboration and cooperation for further development of human resources. It will also present how UNISEC-Bangladesh can bring all Universities together, Concept of UNISEC-Bangladesh, current satellite research and activities on satellite research field.

## Brazil POC Report

João Dallamuta  
Universidade Tecnológica federal do Paraná, Brasil  
[joao@dallamuta.com](mailto:joao@dallamuta.com)

**Keyword:** Brazil, Space Education, CubeSats, UNISEC-Global

### Brazil Space Activities Overview

The Brazilian aviation industry has a privileged position in the global scenario, as a world leader in some categories as regional jets and turboprops trainers. In ultracompetitive categories as corporate aircraft, Embraer is an important competitor side of the Cessna, Bombardier and Gulfstream. The Brazilian general aviation is the second world fleet with more than 10,000 aircraft, just behind the North American fleet.

However, in the space field the Brazilian industry does not have the same expression of the aerospace field. The Brazilian space program progresses very slowly due to the little political prestige and small budgets. This discouragement situation causes a brain drain of the space program to other sectors of industry and a low attractiveness among young people by the space race.

CubeSats programs developed in Brazil in recent years are the only space activities with some practical result and has allowed the maintenance of space engineers in the country in activities outside of government research centers.

The CubeSats programs in Brazil are shown in Table 1.

Table 1. Brazilians CubeSats

Satellite	Builder	Mission	Layout	Status
NanoSatC-BR1	INPE and UFSM	Technology validation	1U	Launched (2014)
Serpens	Universities Consortium	Data relay	3U	Planned for 2015
Aesp-14	INPE and ITA	Scientific	1U	Launched (2015)
Tancredo-1	Tancredo Neves School	Educational	1U	Developing
ITASAT	ITA	Technology validation	6U	Developing
Cubesat 8U	ITA	Technology validation	8U	In project

The Brazilian economy is in a crisis due to the political errors of President Dilma Rouseff. For the years 2015-2016 all satellites new development programs walk slowly, with anticipated new cycle of new satellites to the end of this decade.

### Current Status

The first phase of work in 2014 was with emphasis in public relations, the second phase which began in early 2015 is the formation of student groups. To date, seven students are being told by me to the creation of a CanSat kit for future experiments and competitions in Brazil.

### Report of Activities

The main activities of the POC in Brazil in the first months were public relations. Some lectures in engineering colleges for young students know a little of UNISEC-Global's activities and initiates them into CanSat'se CubeSat's. Two lectures, in the last year, were particularly important; Brazilian Space Agency lecture: May 2014 and Brazilian Symposium Aerospace: June 2014



**Future plans**

1. A web site for UNISEC Brazil
2. A Brazilian competition for CanSat
3. Workgroups in more universities
4. A closer relationship between UNISEC and the Brazilian Aerospace Association

**Difficulties and problems to solve**

**Difficulty in funding.** The Brazilian business culture is not altruistic.

Proposed solution

A major sponsor. An aerospace player wishing to have their brand linked to education actions to space. The current time of economic crisis is not appropriate for negotiations with sponsors, however in 2016 is an action priority the search for sponsorship.

**Lack of space culture.** Brazil has a beautiful aeronautic culture, but it is not reflected in space field.

Proposed solution

Long-term actions for young engineering students better understand the space activities and target their training for this area.

**Little knowledge of the brand UNISEC-Global.**

Proposed solution

Public relations efforts to publicize the brand in Brazil. Were held in 2014 eight lectures to students at some universities.

**Individualistic culture** in projects for space education.

Proposed solution

Demonstrate the need for cooperation for the success of spatial and educational projects.

(End)

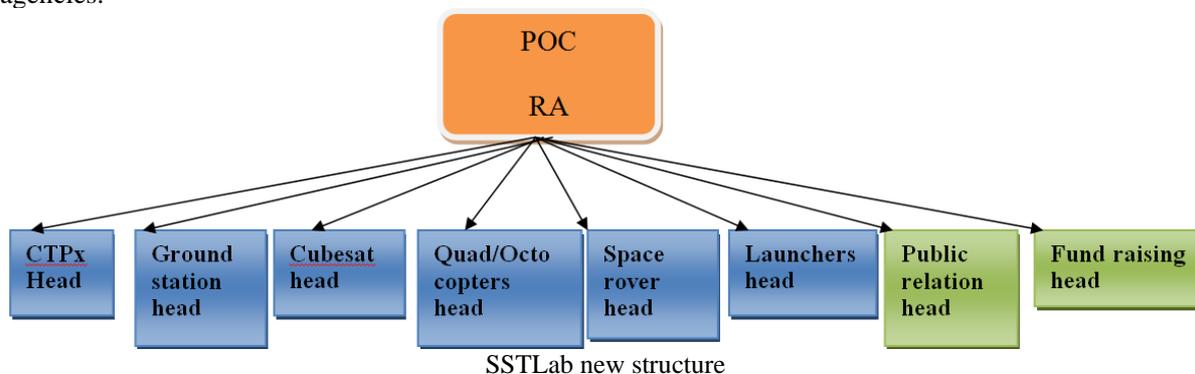
## UNISEC-EGYPT: Strengths, Weaknesses, Opportunities, and Threats

*Egypt/Africa*

Ayman Hamdy Kassem, Mohammed Khalil Ibrahim, Hassan Ali Hassan  
*Cairo University, Egypt*  
[DrAymank@yahoo.com](mailto:DrAymank@yahoo.com)

**Keyword:** CanSat, Satellites, Attitude Control, Egypt

It is the first official year of UNISEC-Egypt. We have reshaped the structure of our lab (SSTLab) to make it a model for other UNISEC-Egypt members. The new structure consists of eight groups and headed by UNISEC POC as shown in the following figure. The first six groups are technical groups for Cansat, Cubesat, Rover, Quad/Octocopter, ground station, and launchers. They are responsible for training and dissemination of knowledge to new students and preparing research teams for other UNISEC-Egypt members. The other two groups are non-technical responsible for the public relation and fund raising. They work hand in hand to handle the communications between the lab and other institutions and funding agencies.



UNISEC-Egypt strength came from the fact that it is not established from scratch. It builds on more than three years of experience and group of professors whom got CLTP training and established the Space Technology Lab (SSTLab) at Cairo University. It also builds on the experience gained by faculty and students in building models (Cansat, Cubesats, Rovers, Quadcopters, etc.). Other major strength is that we get the top students from all over the country and this provides us with the labour force to have the work done.

The weakness came from shortage in managerial, secretarial, and even technical staff. There is a big shortage in technicians and we depend fully on students and research assistants to have things done. We also don't have a dedicated budget for research.

There many oppourtunities for UNISEC-Egypt. There is a booming of space education in Egypt. There was only one university teaching space which is Cairo University. Now, there are five more universities applied to establish space programs. This will increase the number of students and improve the competition and the outcomes. We also started to get applications from different universities and research institutes such as: Alexandria Library, Zewail University, and National authority of remote sensing and space sciences.

The main threat is the bureaucracy. It became harder and harder to acquire new space related equipment due to security checks and paper work. Even for simple non-space equipment like open source CNC machine, it took 4 months to finish its paper work. There is also difficulty in funding as most of the money is spent on security.

The presentation will discuss all these subjects in addition to our future plans which include the continuation of CanSat Education, the sharing in national and international competitions (EED, ARLISS, MIC, etc.), the improving of CubeSat (moving to engineering Model) and the cooperating with different Egyptian research institutions such as NARSS and Ministry of scientific research.

## **UNISEC-Europe**

Klaus Schilling, University of Wuerzburg

In order to promote UNISEC objectives in spring 2014 several local UNISEC chapters joined forces to cooperate on project-based space education within the frame of UNISEC Europe. Objective is to motivate by space exploration related tasks students of different age classes and to promote at Universities hands-on activities to realize systems in complementarity to today's more theoretically oriented classes. Exemplary cooperation will concern ground station networks, joint CubeSat missions, and educational workshops / conferences. Applications for space education related topics are intended for the European Union educational and space related programs in order to provide a financial basis for future joint regional space outreach activities.

Members are so far

UNISEC-Germany  
UNISEC-Samara  
UNISEC-Turkey  
UNISEC-Lithuania

Webpages have been established at

<http://unisec-europe.eu/>

An article about the cooperation of UNISEC Europe and UNISEC global was published in the EU-Japan News 3, Vol.12 (October 2014), page 14.

## Introduction to Activities of UNISEC-Japan

*Japan*

Mengu Cho<sup>1</sup>, Rei Kawashima<sup>2</sup>

<sup>1</sup>*Kyushu Institute of Technology, Japan;* <sup>2</sup>*UNISEC, Japan*  
[cho@ele.kyutech.ac.jp](mailto:cho@ele.kyutech.ac.jp)

**Keyword:** Education, Space Engineering, Practical Activities, NPO

This presentation introduces activities of UNISEC (University Space Engineering Consortium). UNISEC was formed in 2002. Its mission is to facilitate/promote university level students' practical space development activities, such as designing, manufacturing and launching small satellites and hybrid rockets. It now consists of 67 laboratories/groups from 47 universities made of 811 student members and 267 individual supporters 23 corporate supporters. The activities have 3 pillars, Human resource development, Technological development, and Outreach.

In the past 12 years, universities associated with UNISEC launched 34 satellites into orbit. The small satellite activity grew from CanSat to CubeSat and Nano-satellite. The satellite mission grew from pure educational purpose to even practical application such as the Earth remote sensing, etc.

Through human resource development projects, UNISEC aims to provide researchers/engineers who have  
Provide many engineers/researchers who have

- Project management skills
- Proficient knowledge of satellite/rocket and their subsystem design and manufacturing
- Systems engineering and integration
- “Guts” to tackle challenging problems

to Japanese space sector as well as many other technological areas such as automotive, aircraft plants, electronics, construction, etc.

UNISEC has provided university students with opportunities to observe and exchange;

- What other universities achieved and how, leading to strong motivation making them think they do something similar
- Hints of achieving something (rocket, satellite, CanSat, etc)
- Competitive feeling (if they can do it, we can do it better !!)

Highly motivated leading persons (such as professors) have to think continuously what they can achieve even without enough resources.

**UNISEC global Korea activity  
: Gathering as a consortium**

*Korea  
In-Seuck Jeung  
Seoul National University, Korea  
[enjis@snu.ac.kr](mailto:enjis@snu.ac.kr)*

**Keyword:** UNISEC, global, Korea, Consortium

As UNISEC is a University Space Engineering Consortium, the most important part would be forming the consortium itself. As for forming the consortium is the most important part, it is also the most challenging part for the following three major reasons.

- 1) The start is always the hardest.
- 2) A common goal must be met for the consortium to form.
- 3) The challenge in gathering together already existing events.

The first reason is the part where the UNISEC global POC will take in charge, and the second reason is naturally solved under education. Furthermore, several meetings regarding brainstorming ideas in order to come up with common goal for CubeSat missions were held in Seoul National University within 2014-2015.

Regarding the third reason, there are already various existing aerospace events in Korea, such as National University Rocket Association (NURA), CanSat Competition Korea, and CubeSat Competition Korea. Combining the three events into one is practically an impossible job for a short-term plan, thus definitely remains a challenge.

Reflecting on the third issue, in order to gather a consortium in Korea, UNISEC Korea must be formed in a way such that UNISEC Korea does not stand on top of the three events, however, runs in parallel with the already existing events. This means the main job of UNISEC Korea will be supporting the already existing events starting by advertising the various events going on to the members of the consortium, in order to promote space education. In a long run, the role of UNISEC Korea will be providing students with additional education such as lectures from field active professionals, or organizing programs such as CanSat Leadership Training Program (CLTP). Some specific plans are listed in the following.

Near term plans for UNISEC Korea

- 1) Form a consortium.
- 2) Get in contact with NURA, CanSat & CubeSat Competition.
- 3) Organize an annual UNISEC Korea meeting.

Long term plans for UNISEC Korea

- 1) Organize a programs such as educational lectures or CLTP.
- 2) Organize a joint space activity within the consortium.

(End)

## **CanSat training for engineering undergraduate students by UNISEC-North Mexico**

*North Mexico*

B. M. Lopez-Acosta, H. Moreno-Alvarez  
Universidad Autónoma de Chihuahua, Aerospace Engineering Program

Point of Contact: Dr. Barbara Bermúdez Reyes  
*Abstract. Presenting- [brissalopez@gmail.com](mailto:brissalopez@gmail.com)*

**Keyword:** Cansat training, UNISEC- North Mexico, Universidad Autonoma de Chihuahua

As part of the academic activities for the engineering and physics students, the first CanSat training is a great opportunity to integrate the systems engineering and to get involved in the UNISEC-North Mexico activities from three different universities, in the north of Mexico.

The Chihuahua's group will be divided in two different teams, and similar case in Nuevo León, the group will be divided in three different teams, each team will take a single project to develop a CanSat kit. Each team will choose a mission and will build a CanSat model along 4 weeks, under advice to Dr. Angel Sánchez Colin, Dr. Hermes Moreno Alvarez y Dr. Bárbara Bermudez Reyes. This cansat training include the collaboration to Dr. Jorge Ferrer Pérez and M. C. Antonio Gomez Roa with invited lectures.

A Team number one from Chihuahua has chosen the mission of taking images with video-camera as a priority, also, this team will take pressure and temperature, in the area of Presa Chihuahua, which is a dam located near Chihuahua city, also the mission includes the comparison with data that will be taken on the same area with a drone, that way the project scope for the CanSat will be proved more properly.

So far, the first group is planning to use the original kit components only, and will be focused on the organization and physical structure to optimize as much space as possible. By using design software and simulators the structural and electronic components will be tested and set to have the best design and to get the most of this experience.

## **Small satellite development and education for space engineering**

Tsolmon Renchin<sup>1</sup>, Balt Suvdantsetseg<sup>2</sup>, Altanchimeg Tsolmon<sup>3</sup>

<sup>1,2,3</sup> National University of Mongolia,  
Remote Sensing and Space Science Laboratory, Ulaanbaatar, Mongolia

Email : [tzr112@psu.edu](mailto:tzr112@psu.edu)

### Abstract

In order to develop space engineering there should be proper education for space science and engineering in Mongolian universities. For this purpose we started the project which focused on preparation for Aerospace engineering professionals and capacity building with jointly Japanese Universities. Within this project we plan to establish and develop the testing laboratory environment for Nano (up to 3kg) and micro (10-40kg). During project implementation period we will collaborate with Space and satellite technology laboratories from the Japanese universities in order to facilitate joint teaching and research for development Space science and space technology in Mongolia. During project time there will be international activities for joint research. Output research works will be using satellite data. Mongolian graduate students will have opportunity to study for their degree programs in Japanese universities.

If we launch small satellite that would contribute to scientific and technological progress in Mongolia. Mongolia needs capacity building and professionals for space technology who can control and maintain after launching Mongolian own satellite. Secondly there is need advanced research on natural resource, water management desertification and other environmental issues in Mongolia using high resolution satellite data.

This UNISEC global meeting allow us to share and experience with international communities on small satellite development.

## **UNISEC-Nigeria– A Progress Report**

Nigeria

Nnadih Ogechukwu<sup>1</sup>, Tejumola Taiwo<sup>2</sup>,

<sup>1</sup>*African Regional Centre for Space Science and Technology Education in English,*

<sup>2</sup>*Laboratory of Spacecraft Environment Interaction Engineering, Kyushu Institute of Technology,  
Kitakyushu, Japan.*

*sonnadih@gmail.com*

UNISEC-Nigeria has manifested her presence in more than three (3) universities in Nigeria since the acknowledgement as a local chapter of UNISEC-Global. She has successfully organized a regional university wide workshop staged at the Electronic and Electrical Department of the Obafemi Awolowo University in Nigeria tagged “The Practice of System Engineering; Case Study of Horyu-IV Satellite” the well-attended seminar was facilitated by a member of the Horyu Satellite project from Kyushu Institute of Technology (KIT), Japan. The participants were fulfilled to be part of this awesome program. The chapter also organized a train-the-trainer hands-on program on CanSat/Rocket design and launch tagged “CanSat water Rocket Leadership Training Program (CRLTP)” it was a huge success. Some participants have also trained others using the skills acquired during the CRLTP.

UNISEC-Nigeria is presently collaborating with the Federal University of Technology Akure (FUTA) in Nigeria to organize an international conference tagged “Pioneering University Satellite Technology in Nigeria”. This program shall be the first of its kind in the region and is planned to bring together Nigerian University students and professionals locally and internationally interested in satellite technology and development in the country. This shall pave the way for the development of first Nigerian University CubeSat in conjunction with Kyushu Institute of Technology, Japan.

The paper shall present a detailed description of these activities, the current status of this chapter, progress made as well as the challenges she is facing in the country.

## Space Development in the Philippines: Education and Policy Component

*Philippines*

Rogel Mari Sese<sup>1,2</sup>

<sup>1</sup>*Regulus SpaceTech Inc., Philippines,* <sup>2</sup>*Philippine Space Science Education Program, DOST-SEI*  
[rmdsese@gmail.com](mailto:rmdsese@gmail.com)

**Keyword:** space education, cansats, microsats, space policy, space agency

As a developing country, space science is a very challenging endeavor in the Philippines due to numerous factors such as low economic growth, lack of trained experts and absence of a concrete space program or policy. The lack of a cohesive and comprehensive strategy for space development has significantly hampered the country's ambition to become a space-capable nation and thus, has lagged behind in space development compared to neighboring countries such as Singapore and Thailand.

Recent activities have been made in the Philippines to develop space science and technology in the government, academic and industry sector. In 2013, a 10-Year Baseline Research study was conducted by the Department of Science and Technology (DOST) and the Manila Observatory to determine the current situation of space development and activities in the Philippines. It provided a list of key stakeholders from the government, academe and industry sector on what are the current capabilities and future requirements related to space science and technology applications. It was also observed that there is a need for national space policy to provide a cohesive and unified strategy for space development in the Philippines. It also recommended the creation of a space agency to serve as the country's sole agency to address all space-related matters.

In 2014, Regulus SpaceTech conducted a project funded by DOST to craft a proposal for the legislation of the National Space Development and Utilization Policy and creation of a National Space Agency. Through a series of stakeholder meetings from various sectors and regions, it was identified that the NSDUP would focus on six (6) key development areas namely: national security and development, hazard management and climate studies, space research and development, space industry capacity building, space education and awareness and, international cooperation. The NSDUP will provide a clear direction and strategy for space development in the Philippines for the next ten years. Furthermore, a draft structure and outline for the National Space Agency was created together with the NSDUP. The budgetary and personnel requirements for the National Space Agency was also determined. Both proposal are currently for approval of the DOST Secretary prior to submission to the Office of the President for legislation.

Also in 2014, the DOST, together with the University of the Philippines, partnered with Hokkaido and Tohoku University to develop the first Philippine microsatellite named DIWATA for Earth observation. The microsatellite will be based on the RISESAT-2 satellite developed by the two Japanese universities. A team of students from the Philippines was sent to Hokkaido and Tohoku to observe and assist in the creation of the DIWATA, which is scheduled to launch in 2016 through the International Space Station. Data coming from the DIWATA microsatellite will be transmitted to Japan and the Philippines for analysis. A second microsatellite is also being planned and schedule for launch in 2018.

Finally, the lack of trained Filipino experts demonstrated the need to focus on space education to encourage students to pursue careers in space science and related fields. Under the Philippine Space Science Education Program (PSSEP) of the DOST-Science Education Institute, students from different high schools in the country were taught how to make and launch water bottle rockets. In October 2015, the PSSEP will conduct the 1<sup>st</sup> Can Satellite Competition for High School Students to encourage students to learn about the basics of cansat development.

Through these series of space activities, the Philippines is slowly building up its capacity for space development. Although some challenges are still needed to be addressed, the rate of progress in the past few years have show that the Philippines is rapidly enhancing its capabilities to become a space-capable nation and a significant contributor in the global space community.

**UNISEC Tunisia Progress in space engineering education and research programs  
(3rd UNISEC-Global meeting)**

*Tunisia/North Africa*

Kamel BESBES<sup>1,2</sup>

<sup>1</sup>*The University of Monastir, Monastir Tunisia*

<sup>2</sup>*Centre for Research in Microelectronics & Nanotechnology, Sousse, Tunisia*

[Kamel.Besbes@fsm.rnu.tn](mailto:Kamel.Besbes@fsm.rnu.tn)

Our activities in recent years revolve around the promotion, the collaboration and the development of Tunisia UNISEC network.

For the promotion, we organized the 2nd Maghreb International Courses in Spatial Technology: Nano-Satellites Design in March 2014 with different lectures of five speakers (Tunisia, Spain and Turkey) and 30 participants among young researchers and university teachers.

In research activities, we continue to develop projects on beacon-satellite based water real time telemetry.

We gave several talks at congresses on our projects and activities, in Tunisia and outside, to develop our network of partners including.

- UN-PSIPW 3rd International Conference on the Use of Space Technology for Water Management, 1-5 April 2014, Rabat, Morocco
- 24th UN/IAF Workshop on “Space Technology for Socio-Economic Benefits” with focus on global health and maritime applications in conjunction with the 65th International Astronautical Congress, 26 - 28 September 2014, Toronto, Canada
- ATSIP'2015 (Advanced Processing Techniques and Information Fusion: Methods & Applications) 21-24 March 2015, Monastir –Tunisia)
- IMEKO TC19 Symposium on Environmental Instrumentation and Measurements September 23-24 2014, Chemnitz, Germany

We have a number of PhD students in the development of nanosatellite applications. We have motivated our students by participation in international conferences and especially the 2nd UNISEC-Global Meeting, 18-21 November 2014 at the University Of Technology-Kitakyushu Japan.

As part of the collaborative initiative between UNISEC-TUNISIA and UNISEC-Turkey, we submitted successfully for funding bilateral research project for two years (2015 and 2016) entitled: Development of Intelligent Control Modules for nano-satellites.

Concerning the development of UNISEC Tunisia, we started with four universities. Three new partners joined us. This are the University of Carthage (Sup'Com) and two research centers: the CERT (Research and Studies in Telecommunication Center) and CRMN (Centre for Research in Microelectronics and Nanotechnology).

Our new challenge is to help and interest our colleagues in North Africa to create university space engineering activities in Morocco and Algeria. This requires better UNISEC Tunisia technology capacities. We have until now difficulties in the acquisition of equipment unavailable locally. We have lack in ground station and cubesat elements provider.

Looking ahead, we expect to continue extension of UNISEC Tunisia national network and the development of experimental work meeting as CanSat and cubesat workshop to demonstrate feasibility and accessibility of space engineering.

All these activities helped raise awareness about opportunities to develop training and research in space engineering and joining our collaboration network.

### **3rd UNISEC-GLOBAL MEETING, 3-5 July 2015, Tokyo, JAPAN**

#### **UNISEC-TR ACTIVITIES AND DEVELOPMENTS**

A.R. ASLAN, PoC and Regional Coordinator

#### **ABSTRACT**

Following 2nd UNISEC GLOBAL meeting, UNISEC-TR (UTEB) activities have continued within calendar year 2015. So far, within 2015, UTEB hold 1 meeting (7th) hosted by another member university, Afyon Kocatepe University. The 8th meeting will be hosted by the Turkish Aerospace Industries on April 29, 2015. The main aim is to increase interaction between UTEB institutions, preferably working on a joint multi-institutional space project. Another priority is to establish a legal status by completing the preparations. The legalization is foreseen to take place within 2015. UTEB also plans to hold the second two week CanSat Leader Training course, dates to be determined during the 8th meeting. Currently UTEB members are looking forward to jointly submit a project proposal to national authorities to receive considerable funding with which a good number of students with practical project experience will be ready to support national and international aerospace industry and research centres, as well as starting their own businesses particularly at university techno cities.

The UTEB members will present a joint paper during ISTS30 in Kobe. The 4th UNISEC-Global meeting is to be held in Istanbul by UNISEC-TR.

The final presentation will detail UNISEC-TR activities within 2015 and beyond.