



According to Bryce Space & Technology Co., among academic operators, Kyutech is No. 1 in number of small satellites launched

Members of BIRDS -1, -2, -3, and -4, on 29 Nov 2018 in front of the lab building



**Archive website:** <http://birds1.birds-project.com/newsletter.html>

All back issues are archived at this website.

**Acknowledgment of support:** This newsletter is supported, in part, by *JSPS Core-to-Core Program, B. Asia-Africa Science Platforms.*

ISSN 2433-8818

# BIRDS Project Newsletter

**Issue No. 48**  
(20 Jan. 2020)

*Edited by:*

G. Maeda

Laboratory of Spacecraft Environment  
Interaction Engineering (LaSEINE),  
Kyushu Institute of Technology (Kyutech)  
Kitakyushu, Japan



**All back issues of this newsletter can be easily downloaded.**

Go to here: <http://birds1.birds-project.com/newsletter.html> and scroll down to the desired issue.

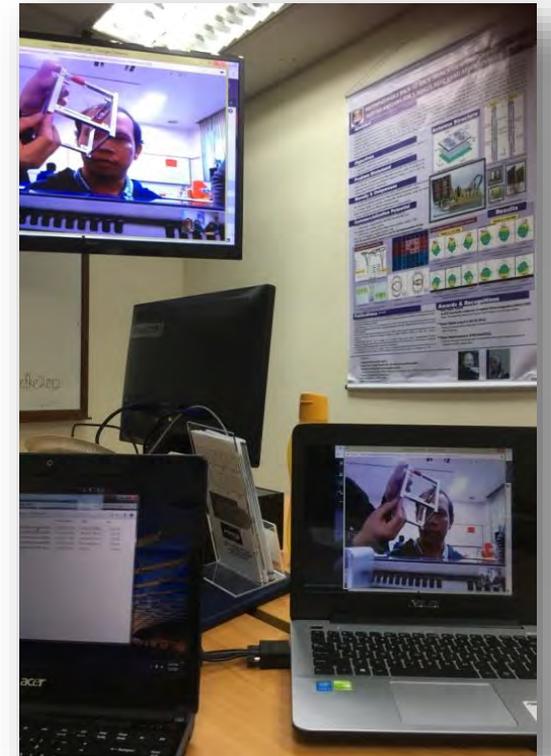
### Table of Sections

1. BIRDS-SEIC End-of-year party
2. London report
3. The Ambassador of Myanmar visited Kyutech on 19 December 2019
4. The 34<sup>th</sup> Annual Small Satellite Conference
5. Olayinka's World – Column #16
6. Column #1 from Malaysia
7. Some of the received greeting cards at the end of 2019
8. December 2019 issue of “Highlighting Japan”
9. Kyutech’s 2019 Field Trip for the international students
10. Sir Fazle Hasan Abed – gone but not forgotten
11. Tenth Nano-Satellite Symposium, Istanbul
12. December birthdays are celebrated at LaSEINE
13. UNIGLO-7 Photo Report
14. Journal of Small Satellites
15. The new space race
16. Congrats to BIRDS-4 member Adolfo !!!
17. Report about a conference at CRASTE-LF by Timothy (Zimbabwe)

**Continued on the next page**

**From UiTM**

**The Guest Box**



Video Conference between UiTM and BIRDS-2 members on 3 March 2017

*This was the first **Guest Box**, in Issue No.15, 30 April 2017*

## Table of Sections (cont'd from the previous page)

18. Report from Paraguay
19. BIRDS-4: JAXA safety review
20. BIRDS-4: Emerging Space Leaders – the experience
21. BIRDS-4: Coil preparation of Flight Models
22. BIRDS-4: Solar panel functionality based on sun simulator tests
23. BIRDS-4: End-of-year party by BIRDS-4 team and by SEIC
24. BIRDS-4: LaSEINE, end-of-year party
25. BIRDS-4: CubeSat fit check
26. BIRDS-4: 2019: A year in review
27. BIRDS-4: The challenges of store-and-forward
28. BIRDS-4: Annual bowling event
29. IAA African Symposium on Small Sats, 11-14 May 2020, South Africa
30. BIRDS-3: Image gallery ... more pics from space
31. Report from the Philippines

**END**



## ***JSPS Reminder***

**When you publish a paper on a topic related to BIRDS, please include this acknowledgement in the paper:**

**This work was supported by JSPS Core-to-Core Program, B. Asia-Africa Science Platforms.**

# Notice

This issue is No. 48 of the *BIRDS Project Newsletter*. Thanks to the enduring support of its faithful readers and contributors since the start of the BIRDS Project (which will soon launch BIRDS-5) , Issue No. 50 will be coming out in March of 2020.

There will be a special section for you to post messages with regards to this milestone issue (**Big Fifty**). Please send your messages to me, and it will get posted in this special section in Issue No. 50 in March. I welcome your comments.

-- The Editor, G. Maeda

## 01. BIRDS-SEIC End-of-year party; more photos in Section 23 (written by Adolfo)



## 02. Better Satellite World awards dinner in London



Better Satellite World  
Awards Dinner

LONDON  
2 Dec. 2019

Written by Abhas of  
BIRDS-3 on 5 Jan. 2020



MC for event:  
Louis A. Zacharilla



Space and Satellite Professional International (SSPI) is the largest membership based organization for satellite professionals and students for the purpose of promoting space and satellites.

Every year, SSPI awards **organizations/projects/people for the work they have done to make a better world** through satellites. The Better Satellite Awards Dinner was held on Dec 2, 2019 in London

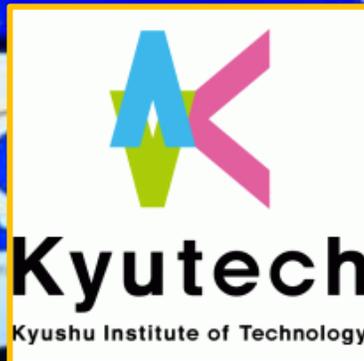
## The Winners



Mr. Chris Lee  
**International Partnership Program**  
UK Space Agency



Mr. John J Morris  
**Geek Without Frontiers**



Prof. Mengu Cho  
**BIRDS Project**  
Kyushu Institute of Technology

116 Pall Mall, St. James's, London SW1Y 5ED, UK





Mr. Chris Lee



UK Space Agency's **International Partnership Program (IPP)** received the award for delivering sustainable economic and societal benefits to 33 projects in 44 countries in emerging and developing across Africa, Asia-Pacific and South America.

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/838118/IPP Brochure April 2019 finaL.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/838118/IPP_Brochure_April_2019_finaL.pdf)



Mr. John J Morris  
**Geeks Without Frontiers**



**Geeks Without Frontiers (Geeks)** is a platform for global impact. A technology neutral nonprofit, Geeks' mission is to bring the benefits of broadband connectivity – health, education, poverty reduction, gender equality and the other UN Sustainable Development Goals (SDG's) – to the estimated 3.5 billion people who remain unconnected.

<http://geekswf.org/initiatives/>



Received in London



Abhas, BIRDS-3 Project Manager

Represented BIRDS Project  
on behalf of Prof. Cho



**Congratulations** to BIRDS PI Prof. Mengu Cho and all members directly and indirectly involved in the project. SSPI and attendees extend their congratulations to all staff, students and members of the BIRDS expanded community including stakeholders, ground station operators and well-wishers.

*Congratulations again*

**END OF LONDON REPORT**

## 03. The Ambassador of Myanmar visited Kyutech on 19 December 2019

# Excellency Myanmar Ambassador Mr. Myint Thu visited Kyushu Institute of Technology on 19.DEC.2019



*Reported by*  
Mr. Zwe Thi Ha  
Master First Year  
Space Engineering  
Kyushu Institute of Technology  
2 Jan. 2020



Myanmar Ambassador Mr. Myint Thu came and visited to Kyushu Institute of Technology (Kyutech) on December 19, 2019. He met with the Vice President of Kyutech , Dr. Teruhisa OHNO.

Mr. Toshi Wakabayashi took as a leader for the campus tour.

**In the group photo, from left to right,**



Mr. Toshi Wakabayashi who is the Director of International Affairs Division, Kyutech,

Prof. Dr. Hirofumi TANAKA, who is the Department Chair, Department of Human Intelligence Systems, Graduate School of Life Science and Systems Engineering,

Prof. Dr. Teruhisa OHNO, who is the Vice President of Kyushu Institute of Technology,

Mr. Myint Thu, who is the Ambassador of Myanmar, Myanmar Embassy, Tokyo,

Mr. Benny Lee, who is from Honjo Fudousan Real Estate company,

Ms. Hnin Ei Ei Khin who is the officer of Myanmar Embassy, Tokyo.

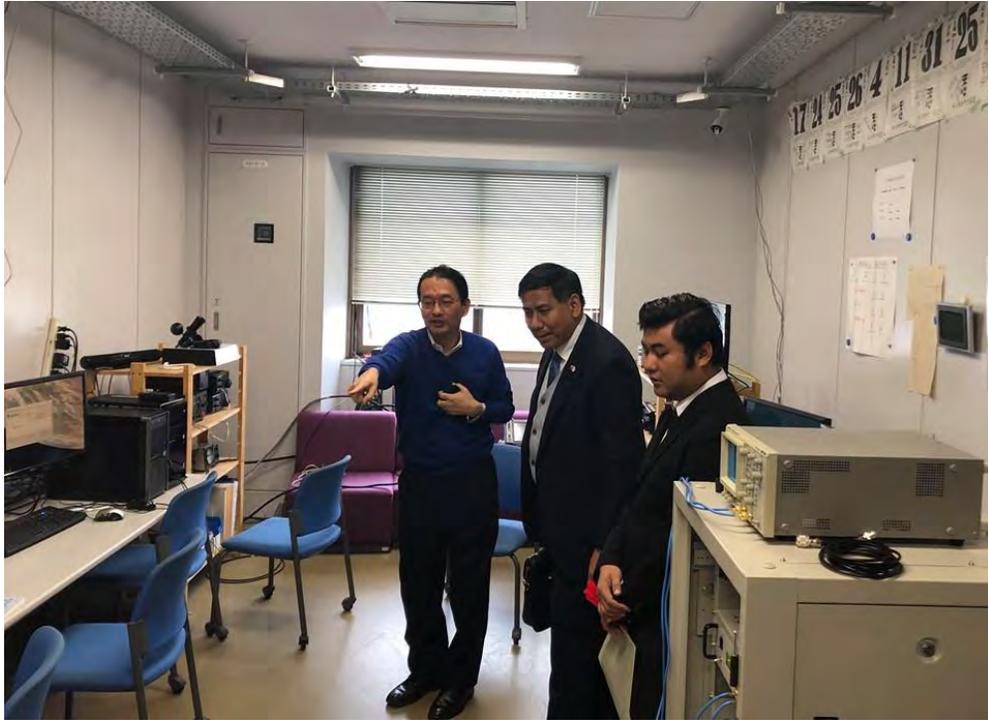


Professor, Dr. Cho explained satellite development processes and satellite development facilities in Cho lab.

The Ambassador is interested in satellite facilities.



After that Professor Dr. Cho explained about BIRDS Projects. Myanmar is now currently on the progress to approve.

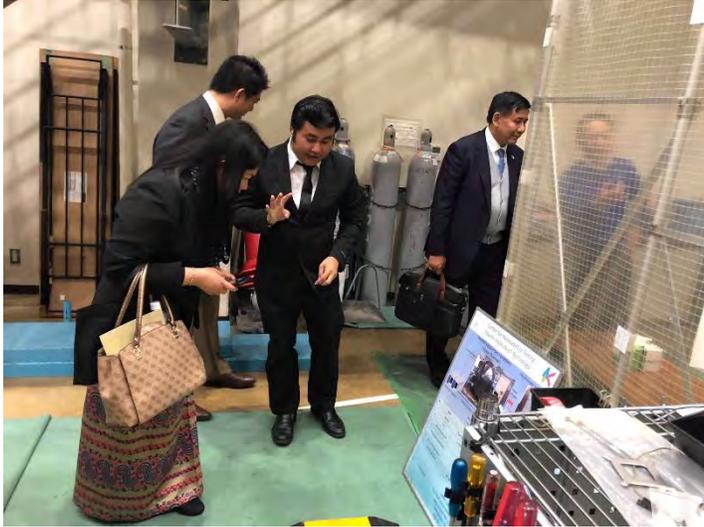


Professor Dr. Cho explained the ground station in Kyutech.  
Kyutech's students use the ground station for BIRDS satellites.

And the Ambassador asked about BIRDS satellites operations.

Professor Cho explained about satellite operations.





These photos are in Nano Satellite Testing Center.  
Myanmar Embassy officers see the satellite testing facilities.  
The Ambassador see the BIRDS 4 projects in which Paraguay, Philippines,  
and Japan are members.

For BIRDS 5 Project, Mr. Zwe Thi Ha is already a Kyutech student and Ms.  
Ei Phyu Phyu will be a student in April, 2020.

The Ambassador is very pleased with this situation.



## Group Photo in Nano Satellite Testing Center

### From left to right,

Mr. Toshi Wakabayashi who is the Director of International Affairs Division, Kyutech,

Ms. Hnin Ei Ei Khin who is the officer of Myanmar Embassy, Tokyo.

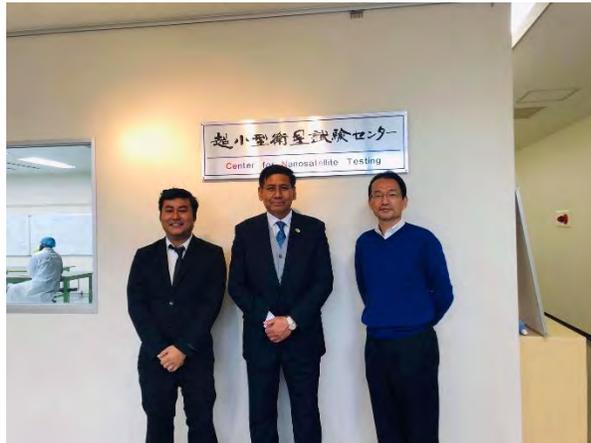
Mr. Zwe Thi Ha, who is the master first year student, Department of Space Engineering, Kyushu Institute of Technology,

Mr. Myint Thu, who is the Ambassador of Myanmar, Myanmar Embassy, Tokyo,

Prof, Dr. Mengu Cho, Director of LaSEINE

Mr. Benny Lee, who is from Honjo Fudousan Real Estate company.

**End of Zwe's Report**



## 04. The 34<sup>th</sup> Annual Small Satellite Conference

### ***Small Satellite Conference***

**August 1-6, 2020**

34th Annual Small Satellite Conference

### ***Space Mission Architectures***

INFINITE POSSIBILITIES

The 34th Annual Small Satellite Conference will explore the realm of possible space mission architectures and how they can be practically achieved to support the diverse needs of the global space community.

**This is by far the biggest  
“small satellite”  
conference in the world.  
Check it out. Each year  
in Utah State, USA.**

*-- The Editor.*

### ***Call For Papers***

Abstracts are now being accepted

**Abstract Deadline February 4**

Homepage: <https://smallsat.org/>



# OLAYINKA'S WORLD

05. Olayinka's World – Column #16

COLUMN NO 16

**OLAYINKA FAGBEMIRO**  
**ASSISTANT CHIEF SCIENTIFIC OFFICER, NATIONAL SPACE RESEARCH & DEVELOPMENT AGENCY (NASRDA), ABUJA. NIGERIA. HEAD, SPACE EDUCATION UNIT**  
**NATIONAL COORDINATOR, ASTRONOMERS WITHOUT BORDERS (AWB) NIGERIA**  
**PUBLIC RELATIONS AND EDUCATION OFFICER, AFRICAN ASTRONOMICAL SOCIETY (AfAS)**



## 2019 ASTRONOMY DAY IN SCHOOLS

The Astronomy Day in Schools program is one of the IAU100 Global Project of the International Astronomical Union (IAU) to mark the 100<sup>th</sup> anniversary of IAU with the vision of mobilising the astronomical community to organise activities in schools. This event presented a special opportunity for students to directly interact and engage with astronomers in their communities, and to learn about the important role of astronomy in our lives.

IAU100 encouraged school visits during this period of the week of **10-17 November 2019**. During this week, 10 November also marked the World Science Day for Peace and Development and a Mercury transit took place on 11 November, which offered an exciting outreach opportunity for the visiting astronomers.

To mark this event in Nigeria, the Astronomers Without Borders (AWB) Nigeria team visited a School, Astute Montessorri School, Kuje, Abuja. where the team engaged with the 4<sup>th</sup> to 8<sup>th</sup> Graders in an exciting way. There were lots of hands on activities and a very engaging Questions and Answers session. The weather was perfect for a beautiful solar gazing session even as the event presented an opportunity to teach the pupils about STEM.



Solar gazing session with the pupils



# UiTMSAT COLUMN

Column No. 1

**Editor: FATIMAH ZAHARAH BINTI ALI**  
PHD CANDIDATE, LABORATORY OF SPACE WEATHER AND SATELLITE SYSTEM  
FACULTY OF ELECTRICAL ENGINEERING  
UNIVERSITI TEKNOLOGI MARA (UiTM), SELANGOR, MALAYSIA

## 06. Column #1 from Malaysia



UNIVERSITI  
TEKNOLOGI  
MARA

UiTM Sentiasa Di Hatiku  
"UiTM Always in My Heart"



## INTERNATIONAL WORKSHOP ON LEAN SATELLITE (IWLS), 2019

On 4th until 5th December 2019, Kyushu Institute of Technology (Kyutech) has organized an International Workshop on Lean Satellite (IWLS) in Tokyo, Japan. As a new appointed Malaysian Editor for BIRDS Project Newsletter, I feel honour to would to share my first column on the IWLS 2019 that I have joined for two (2) days. IWLS is an annual workshop since 2011, focusing and discussing on the lean satellite technology development. This year, the event emphasized on interface, concept, verification, testing, project management, constellation, operation, data mining and distribution, international projects, standard applied and frequency allocation, capacity building, debris, safety, and all other related issues of small



Figure 1: The delegations of IWLS 2019 taking picture before the end of the event.



Figure 2 : One of the presentation conducted by the space company in the IWLS 2019.

satellite system and its applications. Many companies, institutions, and stakeholders who directly and indirectly involved in development of CubeSat and other small satellite system have participated in the workshop by presenting their works, findings, ideas, and lessons that they have learned through the development period and implementation of the technology. From the event, information and new knowledge were exchanged in line with the mission of the workshop which is to find a way in standardizing the system and shrinking the gaps by enacting the International Standardization Organization (ISO). I and the Director of Laboratory of Space Weather and Satellite System, Faculty of Electrical Engineering from Universiti Teknologi MARA (UiTM), Malaysia, Associate Professor Ir. Dr. Mohamad Huzaimy Jusoh,



Figure 3: Some of the participants in IWLS 2019.



Figure 4: A representative from Cal Poly was presenting about the connection standardization on the CubeSat system.

have also joined the ingenuity event as the representatives of UiTM who has partaken in BIRDS project since 2016.

A lot of knowledge, ideas, new approaches and applied methodologies pertaining sub-system connection of the small satellite, specifically, and its payloads were exposed and learned, through sharing session of the stakeholders to the audiences. Furthermore, many constructive comments and suggestions were thrown out in the end of each presentation which eventually led to the comprehensive and understandable explication to the topic discussed. This workshop has improved the comprehension on the



*Figure 5: Mr Tomohisa Kunisawa from Ministry of Economy, Trade and Industry was giving a sponsor's speech.*

satellite system by grasping the direct knowledge and adopting the experiences of the presenters. Therefore, this event is very important to be attended especially for those who are beginners in the small spacecraft system and development. All related institutions and stakeholders including space agency and Start-up Company, with various and distinctive experiences, will gather in the workshop with one intention of exchanging ideas in lean satellite developments. Among the presenters, there were representatives from GOMSPACE, Innovative Solutions in Space (ISIS), GAUSS Srl, a start-up company from NSLCOMM, AAC Clyde Space, Space Business Development Inc., and Cal Poly.

As a sponsor of the workshop event, Ministry of Economy, Trade and Industry, Japan, has been given an honour to give a welcome speech to the attendees as the opening of the event. This event was also filled with tea break sessions one and half hours before and one and half hours after lunch at 12.10 pm in order to let the participants refresh, re-energize and relax throughout the presentations so that they can stay alert and focus on the content perfectly. Drawing on the given 20 minutes time, the participants



*Figure 6: Participants of IWLS during tea-break. From left: Fatimah, Haley Doyle from ISIS, and AP. Ir. Dr. Mohamad Huzaimy from UiTM.*

took this period as advantage for them to have ice breaker activities, networking, and continuous discussion.

Since the workshop was held at a building just across the Tokyo Tower, the organizer has set up a dinner for all the participants. It was on the first day of the workshop at 6 pm. All the participants had much time during the casual dinner to get to know each other and getting serious discussion on related topics of satellite especially on projects.



Figure 7: A dinner was conducted at 8 pm after the day-1 event at the restaurant in Tokyo Tower. Tokyo Tower is located just across the workshop's building, The Kikai Shinko Kaikan Building. During this activity, participants have opportunity to approach the stakeholders and the discussion was continued in relaxing way.



(a)



(b)



(c)

Figure 8: (a) Me in front of the Tokyo Tower after the dinner, (b) and (c) The participants of IWLS 2019 during the dinner at Tokyo Tower, were having conversation and discussion while enjoying the food.

I am looking forward to the next IWLS and I believe the next event will bring another interesting topics to be focused and discussed, as it always does.



*Figure 9: Some of the participants were listening to the presentation in the workshop. The place was cosy and internet was provided which made it easy for the participants to do works while listening to the presentation.*

**Credit: Most of pictures were taken by organizer of event, Kyutech.**



(a)



(b)

*Figure 10: (a) A presenter from Kyutech was presenting in IWLS 2019, (b) The participant asked questions and gave comments on the presented project. This was how the idea was exchanged and the comprehension improved on the lean satellite development.*

Postscript:



# CALL FOR PAPER

# 2<sup>ND</sup> ICeSSAT2020

SECOND INTERNATIONAL CONFERENCE ON SPACE WEATHER AND SATELLITE APPLICATIONS

Sustainable Exploration  
Towards New Space  
Revolution of Nano-Satellite  
and Space Science

## TRACKS

- TRACK 1 : Science in space weather**
  - Solar system and astronomical instrument
  - Space weather and space climate
  - Space and Earth's electromagnetism
- TRACK 2 : Communication and Satellite**
  - Upper and lower atmosphere / Ionosphere
  - Antenna for space communication
  - Remote sensing and GIS application
  - Satellite and communication technology
  - Nano satellite and payload
- TRACK 3 : Electronics, Data management and System**
  - Space data management system
  - Circuit design and electronic devices for space application
- TRACK 4: Others relevant field**
  - Simulation and modelling for space application
  - Education astronomy and public outreach
  - Space policy, governance and entrepreneurship

## DATE/VENUE

4 – 5 APRIL 2020  
MUTIARA HOTEL, JOHOR BAHRU  
MALAYSIA

## IMPORTANT DATES

Submission deadline  
15 Feb 2020

Notification of acceptance  
28 Feb 2020

Camera ready  
15 Mac 2020

Conference date  
4 – 5 Apr 2020

## ENQUIRIES

[icessat.conf@gmail.com](mailto:icessat.conf@gmail.com)

## PUBLICATION OPPORTUNITIES

- Accepted ICeSSAT2020 paper will be published in IOP journal indexed by WoS and SCOPUS

## REGISTRATION / SUBMISSION

<http://icessat.uitm.edu.my/>

Category	Fee
ICeSSAT Conference	RM1200 / USD 260
Participants Only	RM300 / USD 70

**ORGANIZER:**  
Centre for Satellite Communication  
Faculty of Electrical Engineering  
Universiti Teknologi MARA



End of column  
from Malaysia

# 07. Some of the received greeting cards at the end of 2019



← Paraguay



Thailand →



Japan →



# 08. December 2019 issue of "Highlighting Japan"



THE POWER OF THE YOUNG

\*\*\*\*\*

## E-mail Newsletter "Highlighting JAPAN"

<http://www.gov-online.go.jp/eng/publicity/book/hlj/index.html>

No. 139 (December 2019)

\*\*\*\*\*

December 2019 edition of Highlighting Japan is now available. This month's issue covers 'The Power of the Young': Young people motivated to change society for the better are increasingly coming to the fore in Japan. We meet some of the business leaders and other talented young people making waves across the nation in fields ranging from waste reduction and nursing care to music and fashion:

<https://www.gov-online.go.jp/eng/publicity/book/hlj/20191201.html>

## 09. Kyutech's 2019 Field Trip for the international students

Text creation :2019.12.24



The beautiful 8-arch stone bridge, 'Yabakei Bridge'



'Frogs', the guardian of the bridge

On November 12th, 44 Kyutech International Students from 18 countries had a field trip to Yabakei, Oita and Chikujo Town with the purpose of enjoying the beauty of Japanese nature, especially autumn leaves, and its history and culture. On the way to Yabakei, all the students introduced themselves shortly and tried some quizzes about the places they visited on that day.

In Yabakei, they visited Yabakei Bridge which is called 'Holland Bridge' because of its structural style. They got the wonderful view of the 8-arch stone bridge over the Yamakuni River and met the guardian statue of frogs. After saying goodbye to the frogs, they walked to Ao-no-Domon, the hand-made tunnel which was the great accomplishment of the monk, Zenkai Osho.



Group photo with the statue of Zenkai Osho at Ao-no-Domon



Free time at Keisekien Garden

The group moved to Keisekien Garden which expresses the beautiful natural environment of Yabakei with more than 30,000 trees and a small creek. Unfortunately, it was a bit too early for colored leaves, but they enjoyed taking photos and walking around in the garden.

At the end of the tour, they visited the Former Kurauchi Residence in Chikujo Town. After listening to the brief explanation by the guide, they looked around each room to find the differences in the style of 'Ranma' which is one of the traditional Japanese architecture. They also enjoyed the beautiful scenery of the garden through the windows from the different rooms. Some students borrowed 'Uchikake', women's kimono robe and 'Kabuto', men's armor helmet, and held poses for cameras.

Thanks to the beautiful weather, the students had a great time in all of those places they visited, and it became a memorable day for them.

Full story: <https://www.kyutech.ac.jp/english/en-news/topics/entry-7140.html>

## 10. Sir Fazle Hasan Abed – gone but not forgotten

by Maisun of BIRDS-1 Project,  
6 Jan. 2020



Sir Fazle Hasan Abed, Founder of BRAC is no more with us. He was undergoing treatment for brain tumor.

Sir Abed founded [BRAC](#), one of the largest NGO in the world. He dedicated his whole life to *alleviate poverty and empower the poor*.

His support made '[BRAC Onnesha](#)' possible.

Image: Sir Fazle Hasan Abed KCMG (Image credit: [BRAC](#))

# Sir Fazle Hasan Abed – Life in a glance

Sir Abed was born in 1936, Bangladesh. He studied accountancy in London and became certified as Cost Management Accountant.

After the Liberation war of Bangladesh, he came back to Bangladesh to help refugees.

He sold his flat in London and used that money to start BRAC.



He was Knighted by Prince Charles in 2010 (Image Credit: [TheDailyStar](http://TheDailyStar))

# Sir Fazle Hasan Abed & BRAC University



Image: Sir Fazle Hasan Abed with BRAC School students  
(Image credit: [BRAC](#))

Sir Abed believed poverty cannot be fought without education. He started **BRAC School** to educate the less fortunate children. At present, the education model of BRAC is followed by many.

BRAC University is seen as an extension of this effort. As you may already know, BRAC University is one of the five stakeholders for [BIRDS1 project](#).

# Sir Abed & BRAC Onnesha



From right: Dr. Md. Khalilur Rhaman, Prof. Md. Haider Ali, Dr. Arifur R. Khan, Sir Fazle Hasan Abed, Maisun Ibn Monowar, Raihana Shams Islam Antara, Abdulla Hil Kafi.

In July 2015, BRAC Onnesha team met with Sir Abed to discuss the possibility to build a nanosatellite bearing Bangladeshi flag.

With his blessing and guidance BRAC Onnesha team started working on BIRDS-BB or BRAC Onnesha CubeSat.

**End of article**

# 11. Tenth Nano-Satellite Symposium, Istanbul

## 10th Nano-Satellite Symposium

MICRO/NANO/PICO SATELLITES: INNOVATIONS IN ARCHITECTURE, TECHNOLOGIES AND PLAYERS



HOME VENUE PROGRAM ATTENDING PRESENTING EXHIBITION ORGANIZATION



Exotic, beautiful Istanbul, Turkey

### JOIN US

July 8-11, 2020  
*10th Nano-Satellite Symposium*

July 11-12, 2020  
*7th PRE Mission Idea Contest*

July 11-13, 2020  
*8th UNISEC GLOBAL MEETING*

July 7, 2020  
*LeanSat WorkShop*

**4**  
**EVENTS**  
**IN ONE!**

**CLICK HERE:** <http://nanosat10th.itu.edu.tr/>

## 12. December birthdays are celebrated at LaSEINE



**December  
Birthdays**

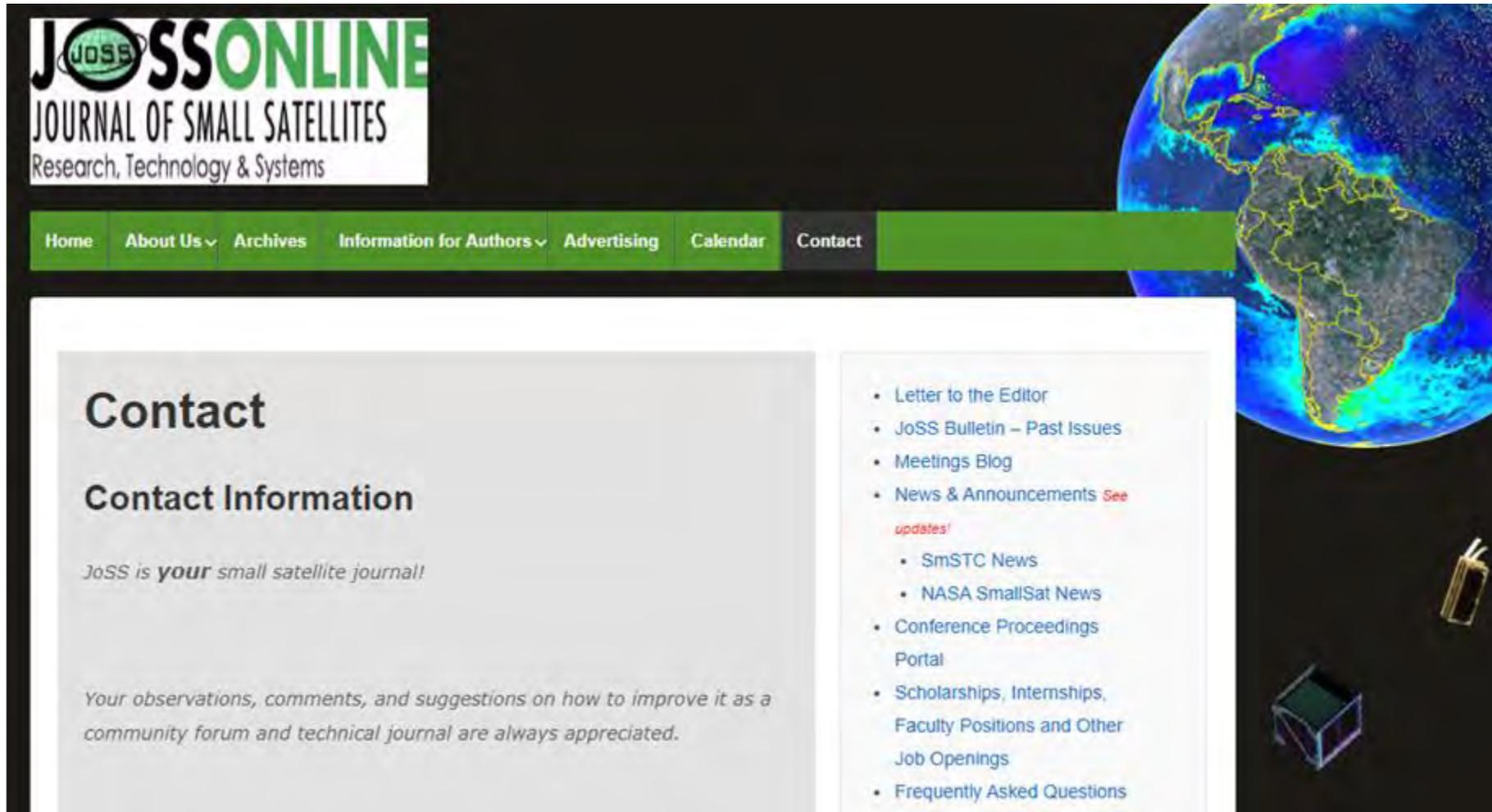
## 13. UNIGLO-7 Photo Report

# The 7th UNISEC-Global Meeting



20 MB pdf: [http://www.unisec-global.org/pdf/uniglo7/UNIGLO7\\_photoreport\\_mid.pdf](http://www.unisec-global.org/pdf/uniglo7/UNIGLO7_photoreport_mid.pdf)

# 14. Journal of Small Satellites



**JOSS ONLINE**  
JOURNAL OF SMALL SATELLITES  
Research, Technology & Systems

Home About Us Archives Information for Authors Advertising Calendar Contact

## Contact

### Contact Information

*JoSS is **your** small satellite journal!*

*Your observations, comments, and suggestions on how to improve it as a community forum and technical journal are always appreciated.*

- Letter to the Editor
- JoSS Bulletin – Past Issues
- Meetings Blog
- News & Announcements *See updates!*
  - SmSTC News
  - NASA SmallSat News
- Conference Proceedings Portal
- Scholarships, Internships, Faculty Positions and Other Job Openings
- Frequently Asked Questions

About JoSS

## Mission Statement

The mission of this international online journal is to provide a high-quality, regularly-published, peer-reviewed publication that addresses all technical, scientific, systems and operations aspects of small satellites. This collective collaboration of researchers, scientists, and spacecraft engineers will provide an important forum for information exchange that will serve to enhance the functionality and utility of small satellites.

**Go here:** <https://jossoonline.com/main/contact/>

## 15. The new space race

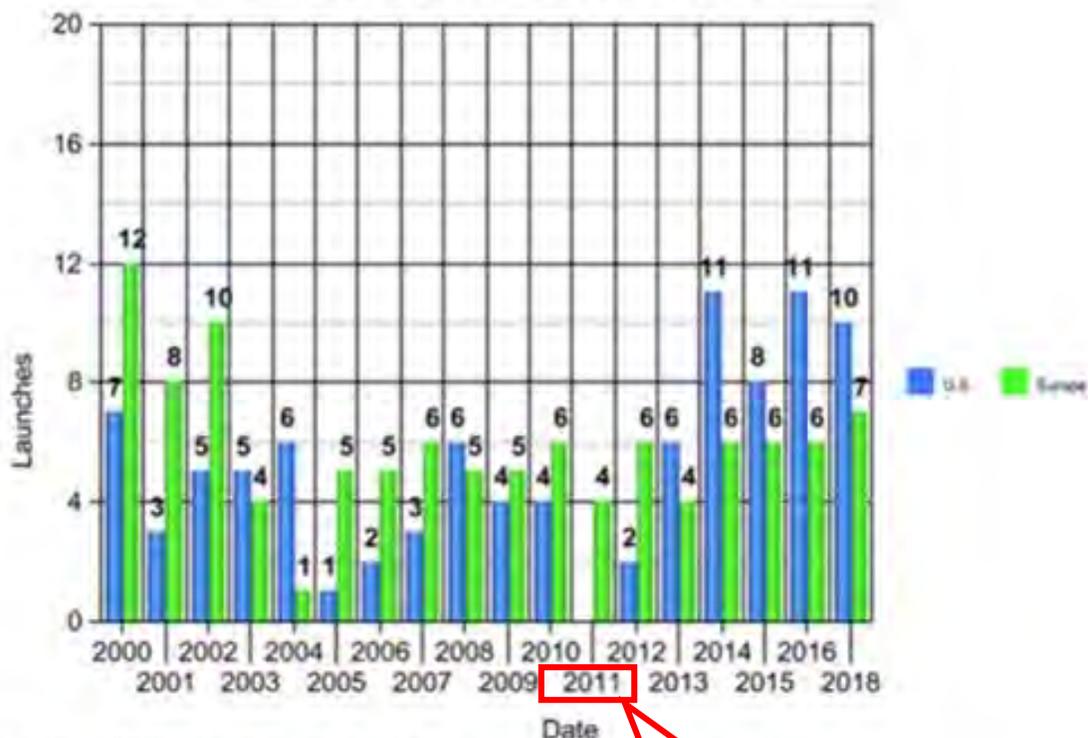
I can highly recommend this 15-min. video by *VisualPolitik EN*

Video link: <https://www.youtube.com/watch?v=xSXFSPF-Imk>



An Ariane launch

### EUROPE vs. US: WORLDWIDE COMMERCIAL SPACE LAUNCH SINCE 2000



Source: Bureau of Transportation Statistics, J. Pappalardo

Space Shuttle  
terminated here

Development (of anything) tends to occur faster with competition at work. The **Cold War** resulted in tremendous space breakthroughs due to the **Moon Race**.

Later, as you can see with the green and blue bars at the left (from this video), Ariane grabbed market share because the **Space Shuttle** was so costly to run.

Now, with the same bars, you can see that Ariane is losing cost competitiveness to SpaceX, et al. **The space race is on again.**

## 16. Congrats to BIRDS-4 member Adolfo !!!

Congratulations to Adolfo (BIRDS-4 team member from AEP, the space agency of Paraguay) who secured a prestigious **BECAL-Paraguay government scholarship** to support his studies at Kyutech.

*Nice job,  
Adolfo!*



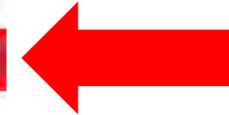
You can find him listed on the next page.



**Programa Nacional de Becas de Postgrados en el Exterior "Don Carlos Antonio López" (BECAL)**

**Doctorados para Profesionales en Ciencias Tecnología e Innovación**

Datos del Postulante						
N°	Código de Postulación	Nombre y Apellido	C.I.	Universidad de Destino	Programa de Estudios	Total de Puntos
1	BCAL09-232	José Arturo Schlickmann Tank	4950044	Universidad Federal de Viçosa	Pós-graduação em Entomologia	404
2	BCAL09-407	Adolfo Javier Jara Céspedes	2854755	Instituto de Tecnología de Kyushu	Doctorado en Ingeniería de Sistemas Eléctricos y Espaciales	396
3	BCAL09-35	Oscar Daniel Salvioni Recalde	4532594	Fundación Oswaldo Cruz	Programa en Biología Celular y Molecular - IOC	389
4	BCAL09-127	Felicita Mabel Duré Pérez	3645356	Fundación Oswaldo Cruz	Programa en Biología Computacional y Sistemas	373
5	BCAL09-264	María Pasionaria Blanco Centurión	4184364	Fundación Oswaldo Cruz	Programa de Pós-Graduação em Vigilância Sanitária	346
6	BCAL09-27	Gustavo Adolfo Roa Acosta	4801357	Kansas State University	Doctorado en Agronomía	335
7	BCAL09-106	Cristian David Melgarejo Torres	4016946	Universidad Autónoma de Barcelona	Doctorado en Medicina y Sanidad Animales	326
8	BCAL09-242	Juan José Cáceres Díaz	3493932	Université Paris Saclay - Ecole Centrale Supélec	Planificación de la red de distribución eléctrica en Paraguay con miras al mejoramiento de la calidad del suministro eléctrico en un contexto de una mayor integración de energías renovables y de una mayor penetración de la movilidad eléctrica	277
9	BCAL09-201	José Fernando Báez Martínez	3843185	Universidad de York	PhD in Economics	262
10	BCAL09-169	Anaí Graciela Vera Britos	2357542	Universidad de São Paulo	Programa de Pós-Graduação em Antropologia Social	258
11	BCAL09-312	Iván Enrique Ballasch Moreno	3516363	Universidad de Barcelona	Doctorado en Biomedicina	251
12	BCAL09-291	Rodolfo José Elias Acosta	794359	Universidad Autónoma de Barcelona	Doctorado en Sociología	235



**This list shows where scholarship recipients will go for their studies (under the yellow box)**

## 17. Report about a conference at CRASTE-LF by Timothy (Zimbabwe)



# CLOUD COMPUTING USING EARTH OBSERVATION -- CONFERENCE TRAINING

RABAT MOROCCO



**CRASTE-LF Rabat, Morocco**  
**11-15 November 2019**

**By:**  
**Timothy Kuhamba**  
**(Zimbabwe)**  
**10 January 2020**



**CRASTE-LF:**

Le Centre Régional  
Africain des Sciences  
et Technologies de  
l'Espace en Langue  
Française

# Outline

- Introduction
- Rationale
- Alignment with AU Agenda 2063 and African Space Strategy
- Objectives
- Content

# Introduction

- The African Union partnered with the European Space Agency (ESA), EUMETSAT, Joint Research Centre and organized a cloud computing for earth observation which was held at [CRASTE-LF](#) Rabat Morocco from the 11<sup>th</sup> to the 15<sup>th</sup> of November 2019.
- The training was attended by participants from 25 African Countries.
- The training focused and equipping African countries on the integration of cloud computing to produce end user-oriented Earth Observation that is accurate and scalable

# Why such training in Africa?

- Africa has the 2<sup>nd</sup> largest continent with 30.4 million km<sup>2</sup> vast natural resources. The estimated data for Africa for the year 2018 was reported to be great than >1.2PB/year.
- This data requires vast amounts of storage to keep the satellite images.
- Satellites with high resolution contain huge amounts of data and more information of the environment but however huge storage is required to store the images.
- Traditionally people store information on USB sticks, hard disks they are large sums of money that are involved in purchasing the storage hardware.

Source esa

# African Union Agenda



- The African Union agenda of 2063 prioritizes skill revolution, with emphasis on soft skills for targeted knowledge-based economies in Africa.
- This is in line with the African Space Strategy reinforcement of capabilities to raise a critical mass of scientists in hardware, software and services.

# African Space Strategy



Professor Bashir representative  
from African Union

African Space Strategy focuses on four service domains:

- (1) Earth Observation (EO),
- (2) Satellite Communication,
- (3) Navigation and Positioning,
- (4) Space Science and Astronomy

# Objectives of the training

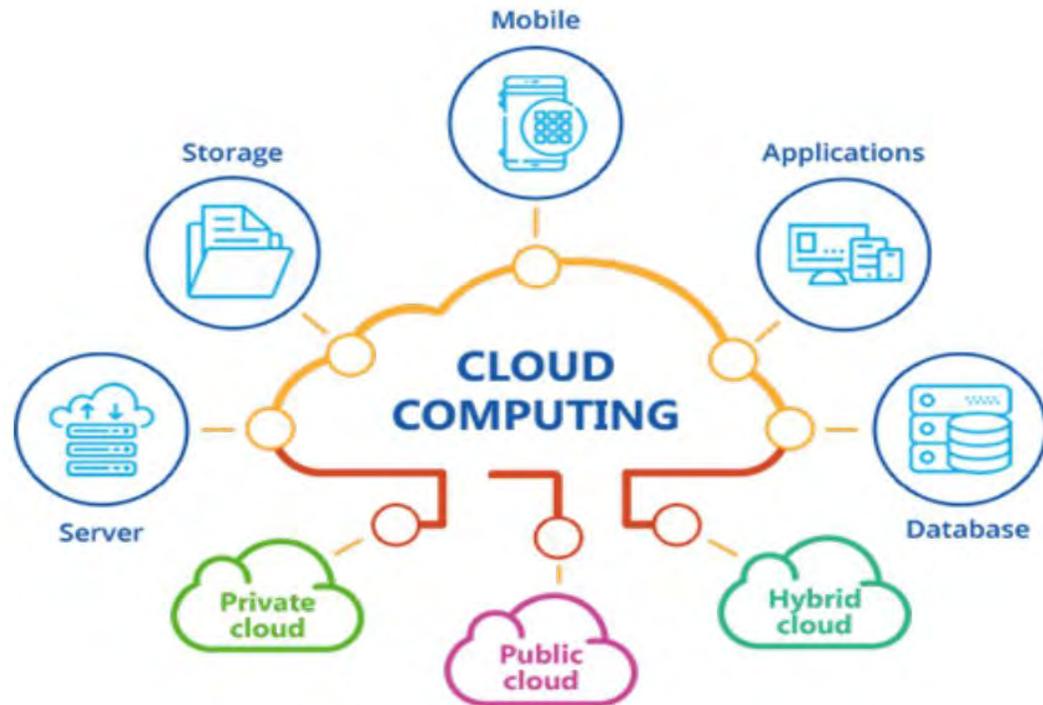
The training focused on EO and how other contributing technologies, mainly Cloud Computing, can be plugged in to produce value-added solutions. The major objectives of the training is:

- 1. To learn about the diversified existing EO & Cloud Computing ecology by appreciating the pros and cons of each technological solution and be able to assess them with respect to the application needs.
- 2. To get acquainted, through hands-on exercises, with a range of technological cloud computing solutions and digital analytical tools in different application context.

# Group Picture for Training



# What is Cloud Computing ?

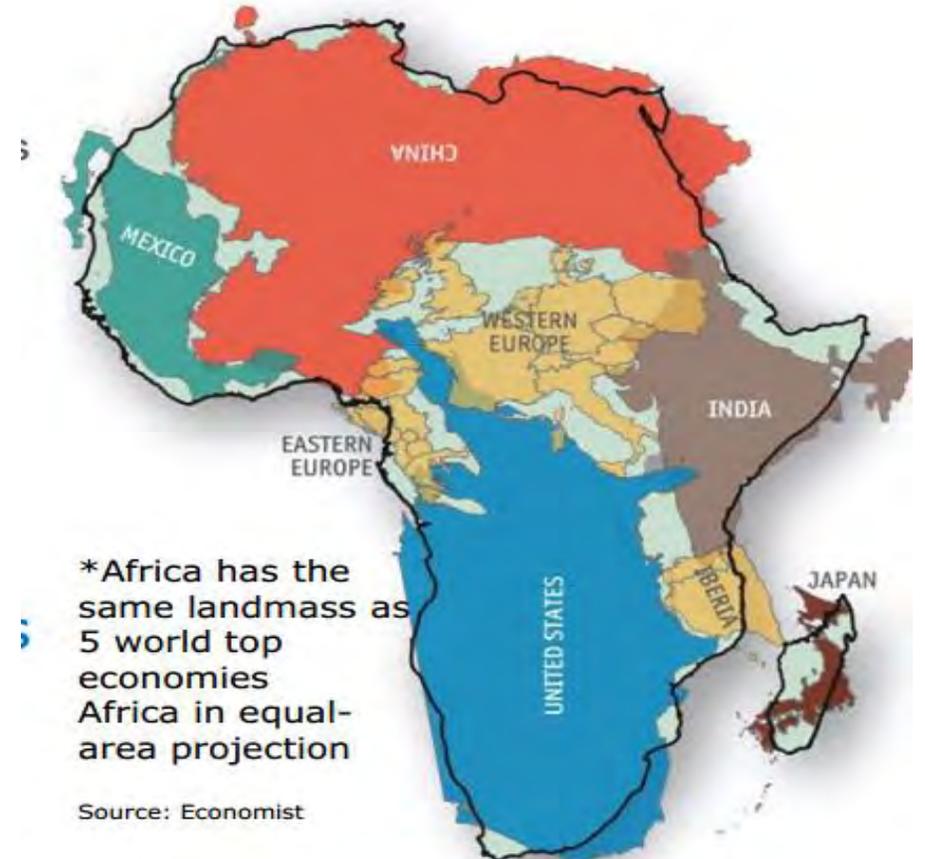


- Capacity to use computer system resources (computing power, data storage, database and applications) on demand by using a network of remote servers hosted on the internet, with no need to manage physically the resources. (Alonso,2019)

# Earth Observation in Africa



Benjamin Koetz giving a lecture  
(European Space Agency, from Earth Observation  
Directorate)



Earth 2<sup>nd</sup> largest continent  
30.4 Million km<sup>2</sup> of vast natural resources  
Demography 1.2 billion (2050: 2.5 billion),  
55 countries

# African Regional Centre for Space Science and Technology Education- in French Language (CRASTE-LF) [CRASTE-LF](#)



Professor Emran Anas Giving an overview of the at African Regional Centre for Space Science and Technology Education- in French Language (CRASTE-LF)

[CRASTE-LF](#)

- Two centres in Africa were inaugurated in 1998:
- The African Regional Centre for Space Science and Technology Education - in French Language (CRASTE-LF) in Morocco,
- The African Regional Centre for Space Science and Technology Education - in English Language (ARCSSTE-E) in Nigeria.

# Work covered during training

Topic	Activity	Facilitator
Introduction to cloud computing	What is cloud computing, how it works, scaling resources, cost-benefit analysis, configuring the cloud, cloud types, models, development, implementation and testing of efficient workflows and algorithms	ESA
Data access platforms	Overview of data access platforms, demonstration of where to find data (and what data), how to access data (Copernicus hub, DIAS JRC demonstration of JEODPP)	ESA/JRC and EUMETSAT
Data pre-processing	Analysis Ready Data: background and importance, hands on exercise with Virtual Machines (and SNAP) in a cloud computing environment	ESA/JRC

# Work covered during training

Topic	Activity	Facilitator
Data processing	Examples of data processing within a cloud environment: Thematic Exploitation Platforms (TEPs), Data Cubes, applied processing tools e.g. Sen2Agri, African Burnt Area map...	ESA
	Hands-on exercises on Wekeo	EUMETSAT

# Participants following proceedings of the training



# References

- Alonso I, 2019 Introduction to Cloud computing
- Benjamin Koetz , 2019 Earth Observation for Africa
- Benjamin Koetz , 2019 Why Cloud Computing in the Sentinels Era
- African Union, 2019 Concept Note on Cloud computing

**End of training report by Timothy**

## 18. Report from Paraguay



FIUNA



FPUNA



UNG

# CApacity BUilding in REsearch & Innovation

For Space

The “CABURE+I 4S” Project

Newsletter

Agencia Espacial del Paraguay  
– Paraguay Space Agency  
(AEP)

News from Paraguay  
January 2020

Contributors:  
Students and members of  
The CABURE+I 4S Project Team

Edited by:  
Cristhian Coronel



# The “CABURE+I 4S” Project Newsletter

## News from Paraguay

### **2019 accomplishments by the CABURE+I 4S Project Team Members**

*2019 has been a great year for the CABURE+I 4S Project team. Since its start as a study and capacity building group leading to a great team of leaders and creators, many achievements and important things happened for all of the team members.*



One of the many meetings held at the CETUNA from the UNA Campus, here the team shares a selfie with their advisors.

The CABURE+I 4S Started as a group of students sharing the same passion for Science, Engineering and Aerospace Technologies. With the support from their advisors from different schools and organizations such as Universidad Nacional de Asuncion (UNA), Universidad Nihon Gakko (UNG) and Paraguay Space Agency (AEP), the group became strong and accomplished some great things. Here are some of them

A team from Paraguay had the chance to compete for the first time in an International Space Related Competition. The KurupiSAT Team took the Paraguay flag to the 2<sup>nd</sup> CubeDesign hosted by the INPE in Brazil, where the team got the 3<sup>rd</sup> place in the CanSat modality.



The KurupiSAT team posing with their cansat after the successful launch test at INPE, Brazil.

The Paraguay flag that along with the 3<sup>rd</sup> Place trophy that the team won on the 2<sup>nd</sup> Cubedesing competition.



# The “CABURE+I 4S” Project Newsletter

## News from Paraguay

### 2019 accomplishments by the CABURE+I 4S Project Team Members

7 students, members of the CABURE+I 4S Team, had the opportunity to participate at the 2<sup>nd</sup> IAA Latin American Symposium on Small Satellites, 6 of them presented their work in the oral presentation, and 1 of them presented a poster. The team was accompanied by their advisors.



(from right to left) Lucas Moreira, Dr. Diego Stalder, Estaban Fretes, Aldo Galeano, Esteban Acosta and Jose Moreira, posing in the entrance of the Centro Cultural de la Ciencia, Buenos Aires, Argentina.



(from right to left) Prof. Javier Ferrer, Cristhian Coronel, Mayra Mosqueda and Dr. Jorge Kurita on their way to the plane that will take them to Buenos Aires, Argentina.



All the presentations went out very good, and two of the CABURE+I 4S Team members got a reward for best Oral Presentation. The Moreira brothers Lucas and Jose received a gift for their brilliant presentation about educational cansat system.



Cristhian Coronel, student from the Nihon Gakko University  
January 2020



# The "CABURE+I 4S" Project Newsletter News from Paraguay

## Getting ready to receive GuaraniSat01 radio-signals at CITEC-FIUNA - Part01!!

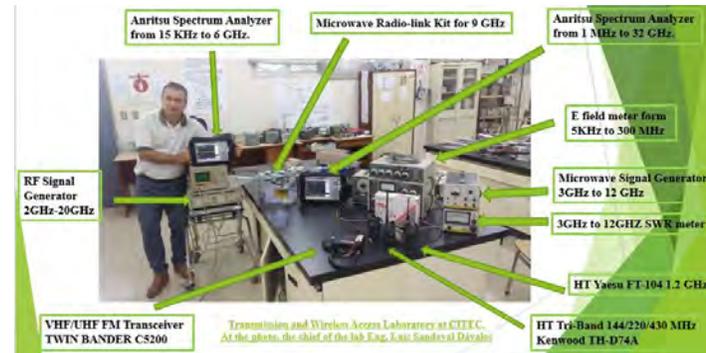
CITEC (Technological Innovation Center) is another place that belongs to FIUNA where Electronic and Mechatronic Students have their laboratories. It is located in a good-height area, free of obstacles, great for catching signals proceeding from satellites.



It is located at the coordinates: 25°17'39"S and 57°29'24"W. Grid Locator: GG14gq

Inside CITEC we have the Transmission and Wireless Access Laboratory. It is equipped with all instruments and equipment related to telecommunication systems for measuring RF parameters.

We can see on these photos some of the equipment. Among all of them, the Anechoic Chamber is very important. We currently do not have one.



Making a survey of the equipment at our lab that could be useful for catching radio-signals from satellites.

# The “CABURE+I 4S” Project Newsletter News from Paraguay

## Getting ready to receive **GuaraniSat01** radio-signals at CITEC-FIUNA - Part01!!

In order to get my degree in Electronic Engineering at FIUNA, the final degree project that I am currently working on is entitled: “A low-cost telecommunication system to establish radiolinks with LEO satellites that works in APRS-DP function, case GUARANISAT01, first Paraguayan satellite”. In order to prepare for receiving radio-signals from space, I plan to mount and install a VHF/UHF Station for allowing APRS-DP function.



There will be placed two omnidirectional Vertical Base Antennas one for VHF and the other for UHF on the top of the highest building, as the green arrows shows. The place has a lightning protection system. The antennas will be supported by pipes fixed to the walls.



Here is a better view of the antennas location.

There will be more news about this. I hope to write again soon. I feel both happy and grateful to have the chance to participate in the 3rd Ground Station WorkShop, that will be delivered at KyuTech, since I was invited. See you soon Japan!!



At the photos, the Chief of the Wireless Access Laboratory of FIUNA, Prof. Luis Sandoval Davalos, holding the two future antennas for our APRS-DP Station.

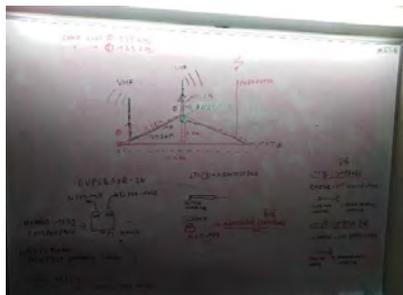


That's me!

**End of report from Paraguay**

**Luis Miranda Kunert.**

I am an Electronic Engineering Student and also Assistant Professor in the subject of “**Antennas and Propagation**” at the Asuncion National University (UNA).



At the Whiteboard, we drew the plan and all the equipment necessary for the APRS-DP Station.

Here is not listed, but it will also be needed a transceiver and a PC.

Luis Miranda Kunert, Electronic Engineering student from Universidad Nacional de Asuncion (UNA) – Facultad de Ingenieria (FIUNA)  
January 2020



# JAXA Safety Review Panel for Phase 0/I/II



Yiğit Çay  
November 26, 2019



# JAXA Safety Review Panel for Phase 0/I/II

Written By: Yiğit Çay

BIRDS-4 is a satellite constellation of 3 satellites put orbit through the release from the International Space Station (a.k.a ISS). A cargo rocket from Earth to ISS orbit is carried out through JAXA so that BIRDS-4 satellites can be sent onboard. Once the ISS crew receives the satellites, they take them from their POD (poly-picosatellite orbital deployer, the carrier adapter) and insert them into the Kibo module of JAXA for the release.

For the spacecraft missions, the hazard levels are defined by the space agencies like NASA and JAXA. The catastrophic level hazard, the highest risk carrier, is defined if human life is endangered by any factor the satellite would cause. As our satellites are handled by the astronauts in the ISS, any failure during this process would be an...

...example of a catastrophic level hazard. In order not to cause such a failure, JAXA has a publicly available standard procedures document for the CubeSat developers. Through the development of our satellites, we were keeping track of these conditions and our first touch with JAXA happened in July to define a launch schedule for BIRDS-4 considering the safety review panels we need to go through as a team.

JAXA has 4 levels of panels to check safety-related detail information of a spacecraft. These levels are named Phase 0, I, II and III. Each level requires certain documentation related to the safety concerns such as battery screening, satellite vibration test, flammable material list, frequency coordination status... etc. According to the calendar defined in July,

we had to submit documents for Phase 0/I/II a month before the panel. After submitting 14 documents, we received comments to revise the 5 documents. We'd reviewed and sent them back at the beginning of the week we had a safety review panel and everything was ready!



*Kibo module in the ISS* [[source](#)]

# JAXA Safety Review Panel for Phase 0/I/II

Written By: Yiğit Çay

It's decided the first 3 phases of the review panel to be held at the same time. Therefore, on October 17, I headed to JAXA's Tsukuba Space Center with Dr. Yamauchi. The panel started at 1 PM and lasted in 2.5 hours without a break. In this panel, the documents we'd sent were carefully investigated and a presentation file was prepared in Japanese for the Japanese committee of the panel. JAXA's representatives mostly discussed the safety review related points within themselves. Only the part we had to explain the satellite in detail was done by Dr. Yamauchi in Japanese. There were very detailed questions regarding the cable type and mission characteristics, but we manage to clarify each point properly. In the end, most of the documents are closed for the revisions and we received...

...minor comments on 3 documents. We immediately worked on and sent them to JAXA. The following week, we'd received the good news that BIRDS-4 successfully passed the revision from Phase 0, I and II!

After the panel, I was assigned as the point of contact between the BIRDS-4 project team and JAXA. We are currently getting prepared for Phase III, which is mostly related to the assembly, integration, and testing of the FM satellites.



Manhole cover art in Tsukuba



JAXA Tsukuba Space Center Entrance Gate



JAXA Tsukuba Space Center – getting closer

# Emerging Space Leaders Experience



Izrael Zenar Bautista  
January 5, 2020



# Emerging Space Leaders Experience

Written By: Izrael Zenar Bautista

The Emerging Space Leaders (ESL) grant programme is an initiative by the International Astronautical Foundation (IAF) to support students and young professionals in the space industry and enable them to be future leaders in the space community by enabling them to attend the International Astronautical Congress (IAC) and events prior to it such as the Space generation council (SGC) and UN/IAF workshop. The grant programme pays for the grantees' plane tickets to the IAC venue, board, and lodging, registration fee for the events and stipend during the event.

For the 2019 ESL grant programme, I was fortunate to be chosen as one of the awardees along with 24 other students and young professionals from all over the world.

The selection process is based mainly on an Essay why you should be chosen as a grantee of the ESL and abstract of a technical presentation submitted to the IAC. Other criteria for selection include country of citizenship, as they want more diversity in the emerging space leaders especially from those countries that have just started their space venture. English language proficiency is also important as it is the language used throughout the events and prior attendance to IAC also merits some points.



Screen shot of the IAF Emerging space leaders website where you can apply [visit: <http://www.iafastro.org/2019-iaf-emerging-space-leaders/>]

# Emerging Space Leaders Experience

Written By: Izrael Zenar Bautista

Aside from me, 3 other students from our university, Kyushu Institute of Technology, were chosen. They are Yasir Abhas from Sudan, Femi Ishola from Nigeria and Rigoberto Morales from Mexico.

For the first week, we have to choose which event prior to the IAC to attend. I chose to attend the Space generation council workshop which was attended by 150 delegates from different universities and companies. The aim of the workshop is to provide ideas and recommendations that will be brought up during the UN COPUOS. This allows students and young professionals to have a voice towards the direction which that space-faring countries and the space industry take.



*ESL awardees with Young Professional awardees*



*Photo taken during the SGC 2019 workshop*

# Emerging Space Leaders Experience

Written By: Izrael Zenar Bautista

The delegates were divided into 5 working groups for the SGC workshop. Each group brainstormed on recommendations and actions to take for each topic:

- Post ISS activities in Low-Earth orbit
- Space Exploration
- Development of Lunar surface mission objectives
- Space and Global Health
- Mars exploration
- Mobilizing and engaging the Space generation for UN Sustainable Development goals
- Education to meet future space sector competencies and skills needs

I was assigned to be part of the Space education working group which was headed by a subject matter expert from the European space agency, Mr. Hugo Maree. Our team had a fruitful discussion of what should be taught to students with regard to space education to meet the needs of the space industry and space agencies. This involved discussion about STEAM (science, technology, engineering, art, and math) and how to address the problems of the current education structure



*Our working group on Space education*



*I presented some of the outcomes of our discussion in front of the delegates*

# Emerging Space Leaders Experience

Written By: Izrael Zenar Bautista



*Delegates for the 2019 Space Generation Congress*



*Photo with Bill Nye the Science guy during the SGC closing dinner*



*Certificate of ESL grant*

**BIRDS Project Newsletter – No. 48**



*Photo of Lunar module replica inside the Aerospace museum in Washington during the SGC closing dinner*

# Emerging Space Leaders Experience

Written By: Izrael Zenar Bautista

After the SGC, the main event which is the International Astronautical Congress started. Events such as technical sessions, plenary sessions, and workshops were held during this week. It was amazing to have listened to these professionals and pioneers in the space sector as they share their outlook and experiences and hope to inspire more people into space research.

Along with the IAC is the expo where several space agencies, companies and institutions showcase their products, achievements, and services. Talking with some of these people and exchanging business cards enabled my network to vastly grow as an aspiring space leader.

Professor Cho was also awarded an award by the IAF as Frank J. Malina astronautics medal recipient for his contribution as an educator in advancing and promoting space education.

I would like to thank the IAF and all the sponsors for this opportunity that they give us. So my advice for those who also aspire to be part of this great space community to try and apply for sponsorship to the IAC with the ESL grant programme.



*Photo taken during the 70<sup>th</sup> International Astronautical congress in Washington DC, USA*



*Prof. Cho with IAF committed receiving the Frank J. Malina medal*

# Emerging Space Leaders Experience

Written By: Izrael Zenar Bautista



*Photo during the IAC opening ceremony*



*Apollo 11 crew Buzz Aldrin, Son of Neil Armstrong and grandson of Michael Collins being honored for the 50<sup>th</sup> anniversary of moon landing*

# Emerging Space Leaders Experience

Written By: Izrael Zenar Bautista



*ESL awardees presented during the closing ceremony of the IAC 2019*



*Photo inside the IAC Expo inside a space suit mock up*

# FM Coil Preparation

Hiroki Hisatsugu

January 5, 2020

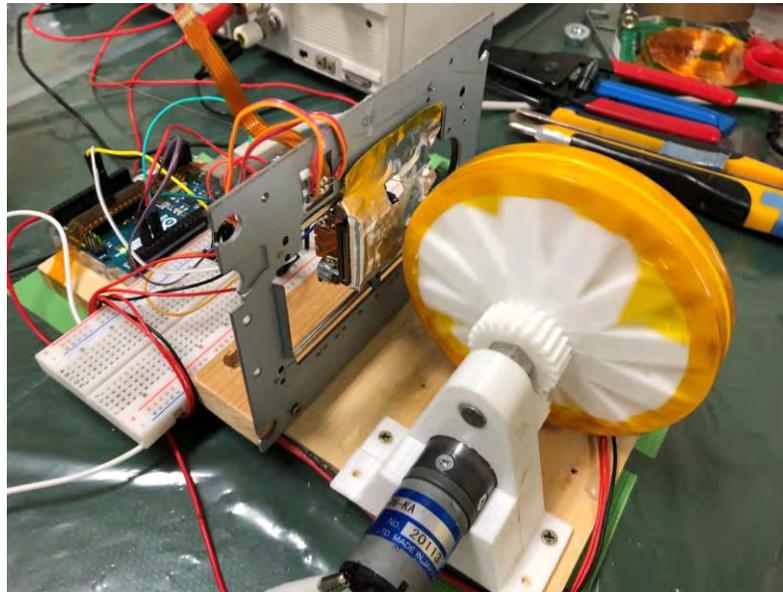


# FM Coil Preparation

Written By: Hiroki Hisatsugu

BIRDS-4 ADCS has 3-axis magnetic-torquer which is made by actual UEW line coils. In Flight Model phase, we manufactured 9 coils for 3 satellites. It was like a “mass production of a factory”. To manufacture the actual coils, I developed an automatic coil-maker although it still needs some handmade optimization. To achieve the required quality, we set three operators. One is to apply the adhesive to the coil, the other is to mix the Araldite (adhesive) in small portions to pass on the applicator, and the other is to manage the coil tension as the tangled coil breaks the line and terminates the production. From our experience, Araldite usage as the glue had to be done quickly. While winding the coil, one person applied Araldite to the coil line just before it's winded.

The other takes the smallest amount of Araldite to be used next from the tube and mixes. The two-component adhesive is hardened in about 5 minutes after mixing, so it was necessary to do these quickly.



*Improved coil maker  
This machine automatically winds the coil*



*Site of coil manufacturing  
The raw coil material is in front*

# FM Coil Preparation

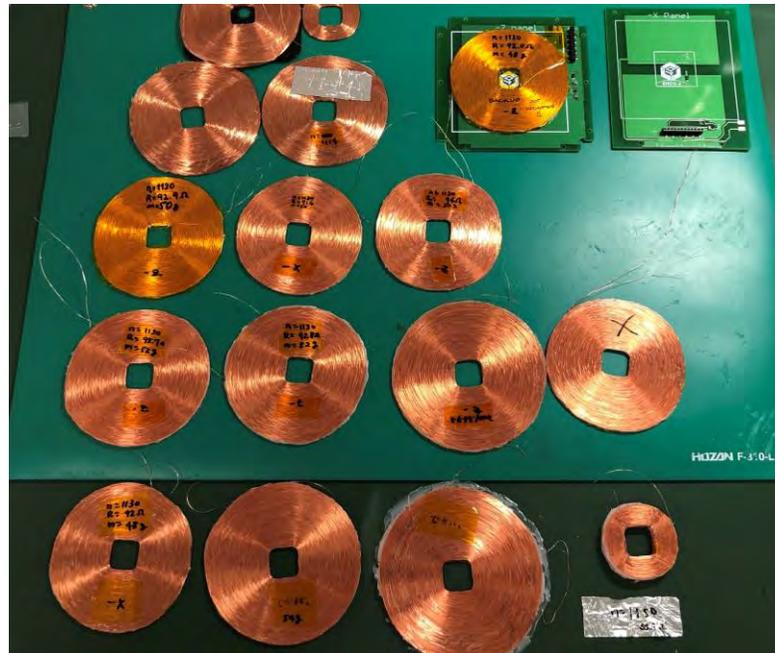
Written By: Hiroki Hisatsugu

Coil maker has also been improved, and the bobbins have been changed into circular shapes. Also, by attaching a gear to the motor, shaft runout was reduced and stable rotation was realized. These parts were manufactured on a 3D printer. It's a very effective tool for the rapid prototyping of a simple part.

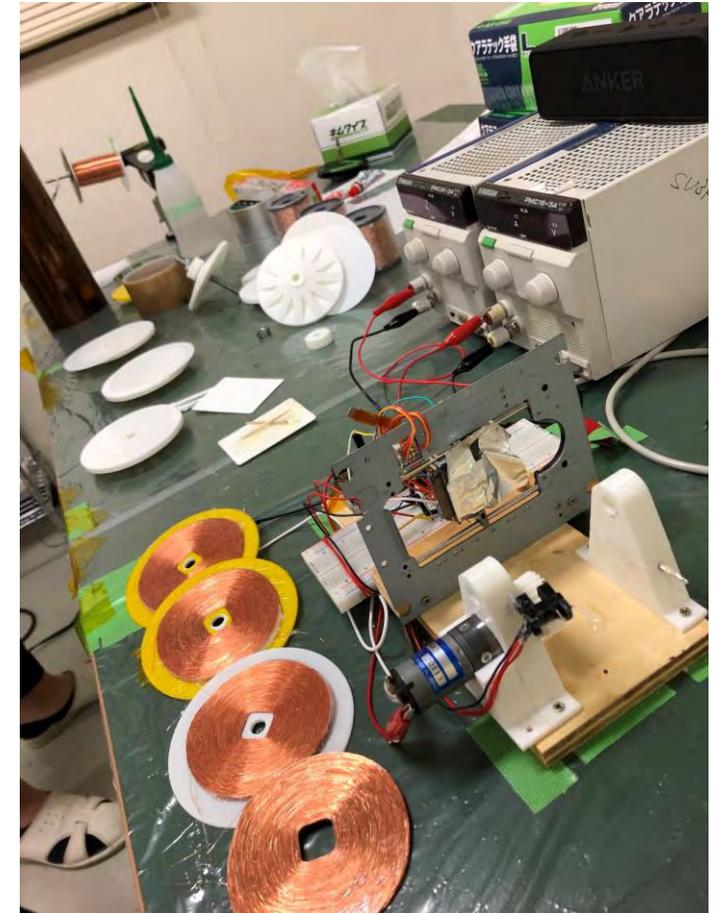
-X panel and -Z panel coils are very thin with a required thickness of 2 mm and have a limited volume, so they easily fail due to changes in bobbin tightening force, line winding, rhythm, and speed.

Some prototypes were made and parameters were adjusted. Practice also improved the skill of the worker's hands.

The winding and pitch shifting are performed automatically by the machine, so anyone who is accustomed to this task could do it.



*Prototype coils after the trial and error in the manufacturing – Some coils were suitable while some weren't.*



*Coil manufacturing site. On November 29, four coils were manufactured. We got very tired to achieve the perfect quality.*

# FM Coil Preparation

Written By: Hiroki Hisatsugu

Once a coil has been manufactured, it was placed in a vacuum chamber to remove air bubbles before the adhesive dries. Then, using a tester or power supply, we tested whether the required values were met electrically and wrote down the individual values on the surface covered by Kapton tape. Out of the many coils, only the "winner coil" meeting the criteria could have a chance to go to space.

When mounting on the FM PCBs, the surface was insulated with Kapton tape and the coils were pasted using Araldite. Then we put it in the vacuum chamber again to remove air bubbles. After soldering the wiring to the PCB and testing whether the coordinate system is correct, the process was complete.

The coil covered with Kapton tape has a beautiful golden shine. These coils were able to function properly as magnetic-torquers in FM functional tests. I am looking forward to their success in space.



*The -Y panel's coil was manufactured with stable quality because there was enough thickness in design.*



*Small vacuum chamber and -X coil mounted on PCB*

# Solar Panel Functionality Based on The Sun Simulator Test



Hari Ram Shrestha

January 5, 2020



# Solar Panel Functionality Based on The Sun Simulator Test

Written By: Hari Ram Shrestha

The Sun simulator test is a laboratory test for the generated power output of the solar cells on the solar panels of BIRDS-4 satellites as the I-V curve results. Our CubeSat have five solar panels, defined as: +Z, -Z, +X, -X and +Y axis panels. One panel contains two solar cells which are connected in series.

Functionality Set up Process: solar panel functionality test of all satellites of the BIRDS-4 project had based on the sun simulator test in the cleanroom.

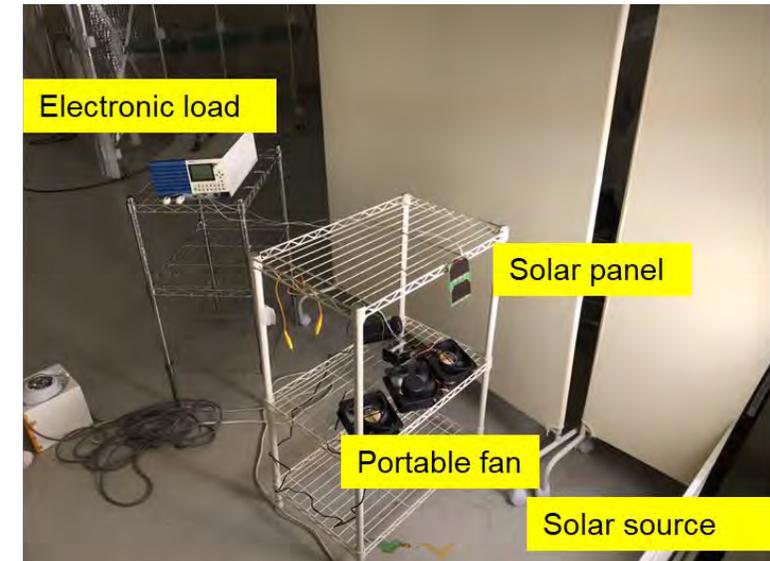
S.N	Equipment's Name	Quantity
1	Sun simulator	1
2	Electronic Load	1
3	Multimeter	1
4	Pyranometer	1
5	Portable Fan	3
6	Goggles	2
7	Solar panel/cells	1
8	Solar hanging stand	1

*Test equipment list*

Functionality test steps:

- ❖ Calibration: Take a position of solar hanging stand in front of the simulator by using a pyranometer for calibration. The light intensity of the sun simulator system at 10 mV where voltage should be checked by a multimeter.
- ❖ Make sure the polarity of solar panel on 12 pin connector and connect it to the electronic load
- ❖ Hang the solar panel carefully and properly at stand
- ❖ Turn on the Sun simulator device
- ❖ Turn on the fan and focus to the Solar Panel
- ❖ Turn on the electronic load and set the constant current (CC) and slew rate around 2.50 mA/ $\mu$ s.
- ❖ Increase the load current through coarse/fine at electronic load with 50 mA intervals

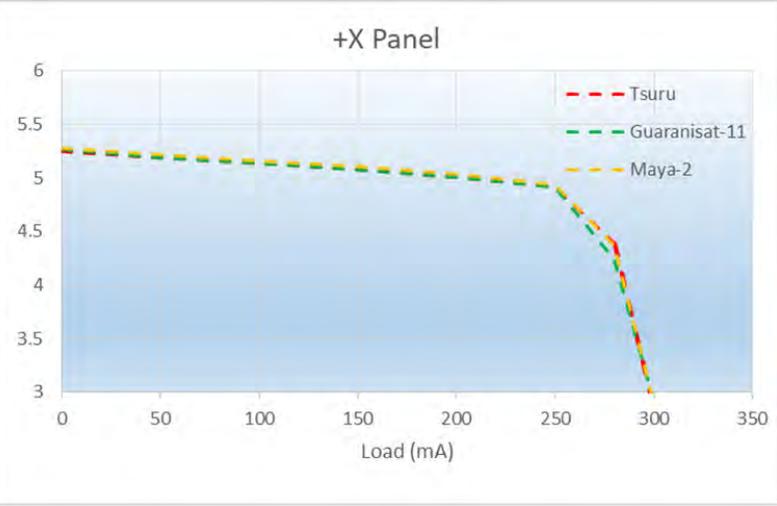
- ❖ Measure and read the voltage, current and as well as output power form electronic load display one by one
- ❖ Increase the load current slowly and see at the point when the current-voltage and power are not stable, then stop to measure the value



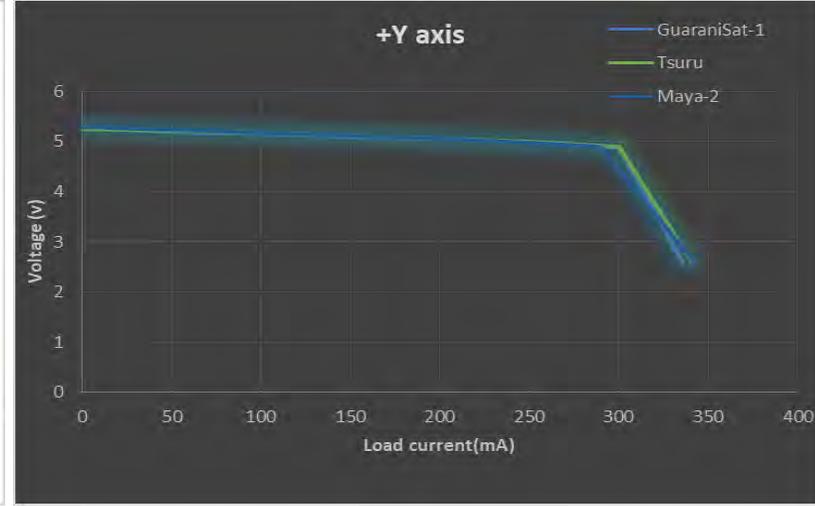
*Measurement set up of the sun simulator test*

# Functionality Test set up and Results

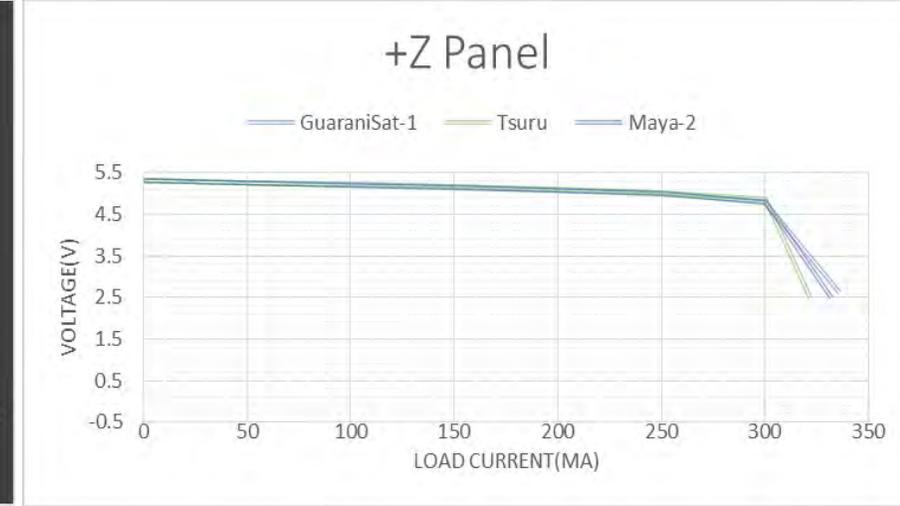
Written By: Hari Ram Shrestha



+X results for the all satellites



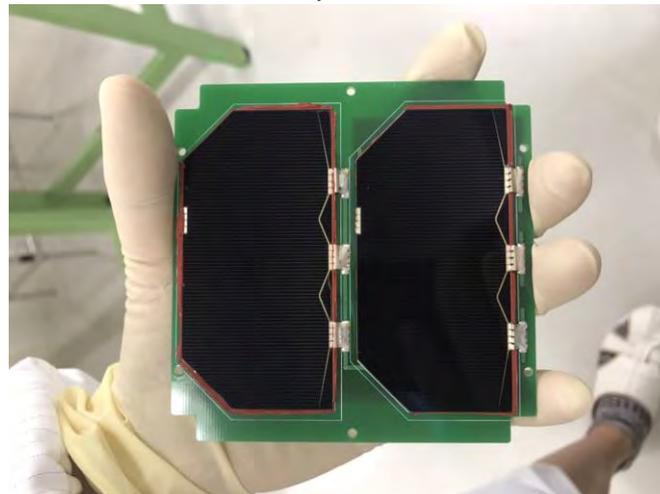
+Y results for the all satellites



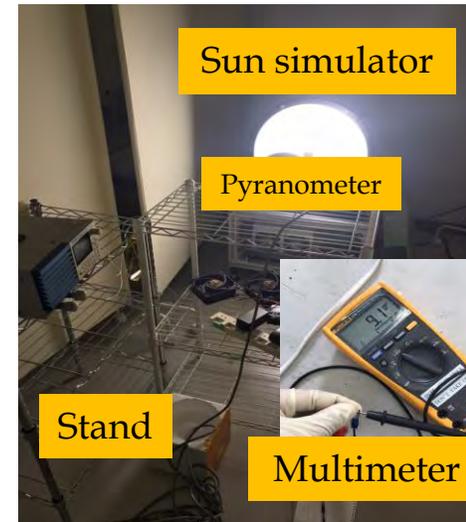
+Z results for all satellite



During the test: Adolfo, Hari and Mark



+Z solar panel



During the calibration  
Page 79 of 122

# SEIC/BIRDS-4 Year-end Party



Adolfo Jara  
January 5, 2020



# SEIC/BIRDS-4 Year-end Party

Written By: Adolfo Jara

In order to say goodbye to a year of hard work, the BIRDS-4 team organized a dinner party on December 24 to thank all the staff members and colleagues who are part of this great family.



*The group photo of all SEIC (Space Engineering International Course) students and staff members*



*Professor Cho provided a few words summarizing a great year of hard work, and he also referred to the great year that is coming for the BIRDS4 team.*

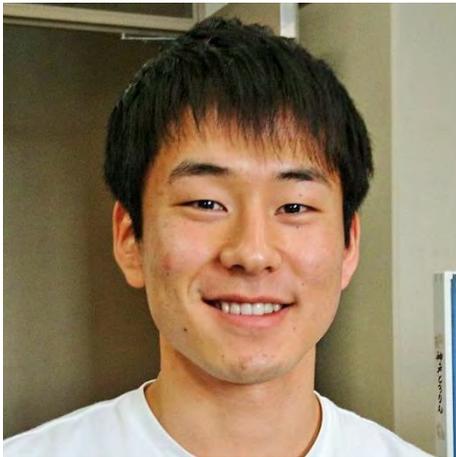
# SEIC/BIRDS-4 Year-end Party

Written By: Adolfo Jara



Normally, we throw the year end party with our families, but we've been away from home here in Japan. Fortunately, we had the opportunity to spend it with the family that Kyutech gave us.

# Cho Lab Year-end Party



Tomoaki MURASE  
January 06, 2020



# Cho Lab Year-end Party

Written By: Tomoaki Murase

We had a Cho lab year-end party on December 29. This type of party is called Bonenkai (忘年会, literally "forget the year gathering"). A bonenkai is a Japanese drinking party that is generally held among groups of co-workers or friends. The purpose of the party, as its name implies, is to forget the woes and troubles of the past year, and hopefully look to the new year, usually by consumption of large amounts of alcohol. It is a unique Japanese culture.

It is held at every end of the year in Cho lab and we enjoy eating and drinking. This year a lot of people who have graduated from Cho lab attended and enjoyed. We ate delicious meat, vegetable, and fish. We could talk to alumni about their jobs and exchange information.

Finally, we drunk well and took a group photo hoping we are doing very well next year.

In our case, we are developing satellites. We should do it well, so I swear to work hard for BIRDS-4 in 2020.



*Group photo at the end of the party*



*They served a lot of delicious foods!*

明けまして  
おめでとう  
ございます

*"Happy new year" in Japanese (above)*

# Fit Check



Anibal MENDOZA  
January 06, 2020



# Fit Check

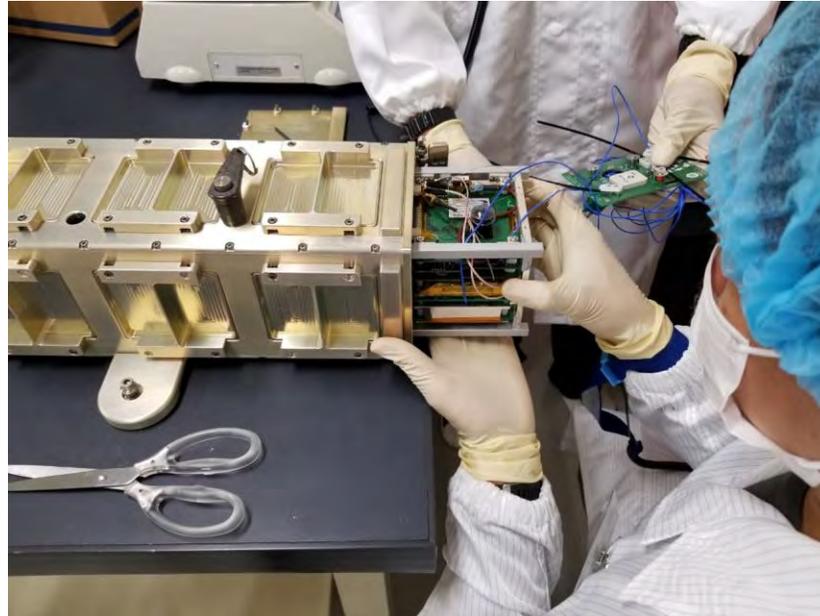
Written By: Anibal Mendoza

Fit check is one of the “simplest” inspections that CubeSats and other satellites must overcome to be approved for launch.

As the name says, this procedure consists on checking if the satellite fits properly on the launcher POD with ease as a safety precaution.

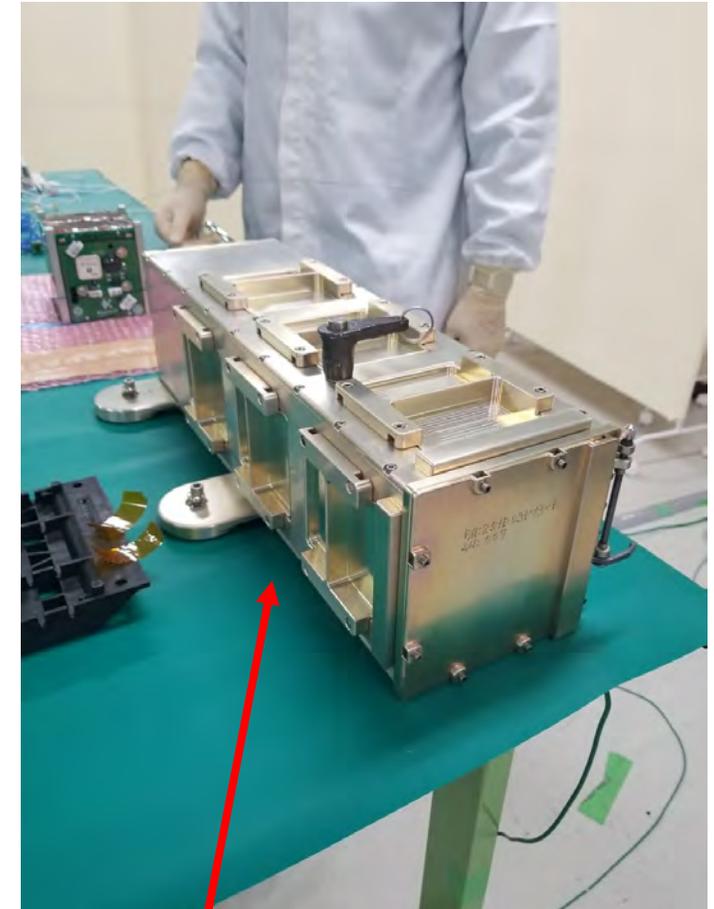
If there is roughness or the structure gets damaged (scratched), it will not be accepted for launch, since it can damage the launcher POD.

To maximize the possibility of a successful fit check, the structural parts should be manufactured within the limits of its technical drawings and the assembly should be done correctly.



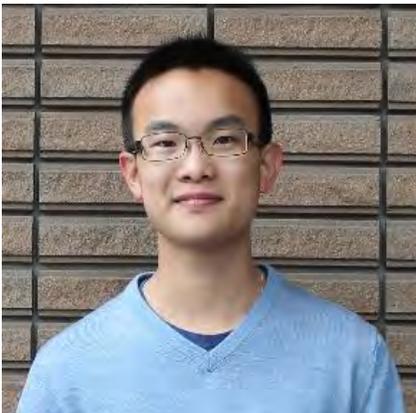
*Fit check during assembly of 1U CubeSat*

This procedure is done several times during the development of the satellite. Commonly, it is preferred to be done during and after assembly, and before and after thermal vacuum and vibration tests.



*Testing **POD** lent to LaSEINE by JAXA*

# BIRDS-4 2019: A Year In Review



Timothy Ivan Leong

January 7, 2020



# BIRDS-4 2019: A Year In Review

Written By: Timothy Ivan Leong

2019 has been extremely productive for BIRDS-4, as we are approaching the end of the satellite development let's take a look at what happened to BIRDS-4 in 2019.

The year started after the MDR presentation that defined the missions BIRDS-4 would be embarking inside its satellite. Work on the satellite really started to get in full stride after that.

Overall, the year was very busy for BIRDS-4 members. The biggest Milestone were the Preliminary Design Review (PDR) in April, the Critical Design Review (CDR) in September and the FM assembly at the end of the year.

These big Milestones were big deadlines for us team members but we managed to reach the objectives we set for each one of them mostly on time.

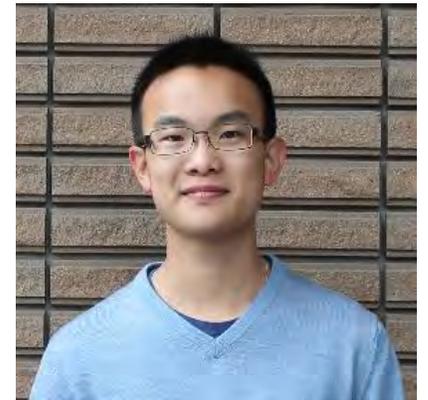
Pressure raised and lowered alongside each of the approaching milestones. The development of BIRDS-4 never really let us have a moment of respite (although we got a small rest after CDR in September) but the most busiest time were clearly during the approaching milestones.

On the next slides will be statement from some of the BIRDS-4 members about the passed year, a timeline of BIRDS-4 small and big milestones and lots of photos from the past year.

This and following page is dedicated to the thoughts of some BIRDS-4 members about this year.

*Comment from Yigit: We always hope our readers to enjoy reading our newsletter articles while trying to maintain a certain quality level in our minds. That's why I'd like to thank Timothy for this brilliant idea and hard work he put in this issue of his BIRDS-4 newsletter. I certainly enjoyed bouncing ideas and editing with him.*

## Comments from Members



Timothy Ivan Leong

“Hard but really interesting and fulfilling work”

# BIRDS-4 2019: Comments from Members

Written By: Timothy Ivan Leong



Mark Angelo Purio  
*" I don't know why it works now? "*



Yasir M.O. Abbas  
*" Why is it not working??? "*

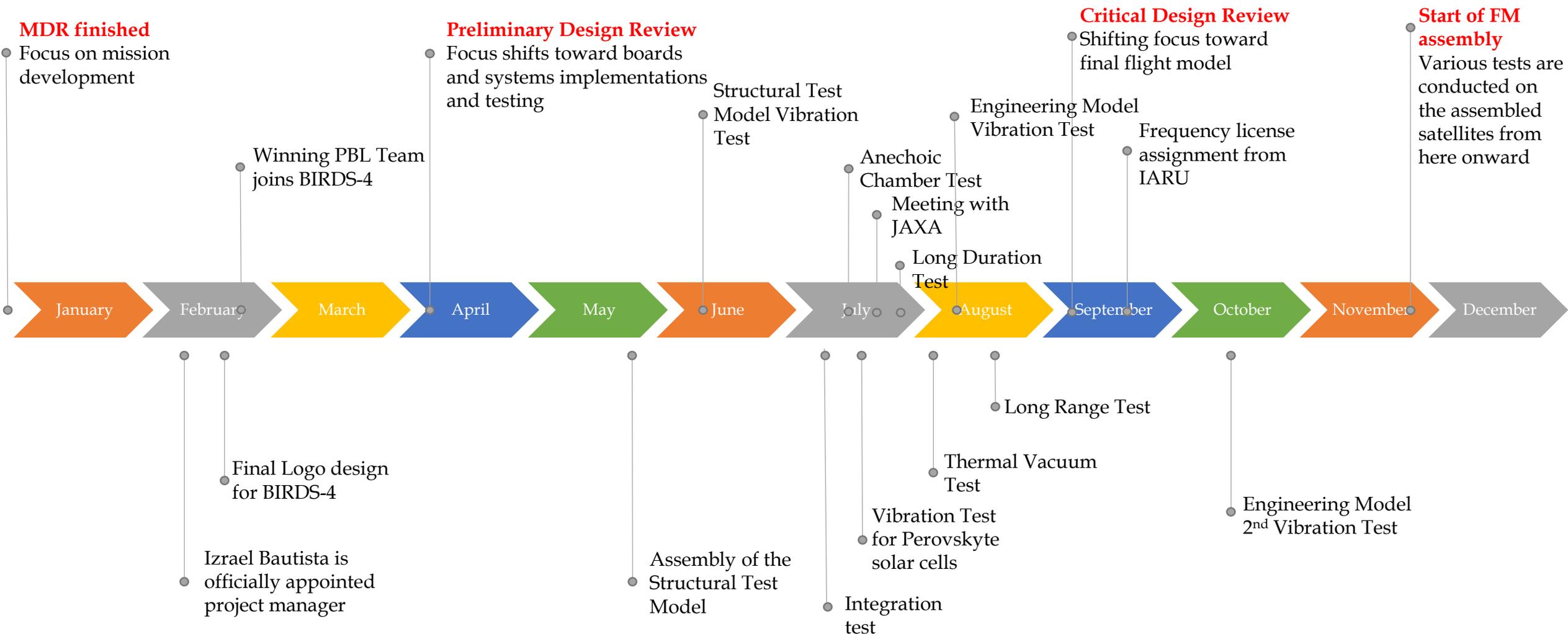
Yiğit Çay

*"A year in BIRDS-4 project passed in the blink of an eye for me. We lived through the satellite project and gained many engineering, as well as the social skills along the way. Now it feels nice to see the end product we were ambitiously dreaming as a team. "*



# BIRDS-4 2019's Milestones

Written By: Timothy Ivan Leong



# BIRDS-4 2019: Photo Album

Written By: Timothy Ivan Leong



# BIRDS-4 2019: Photo Album

Written By: Timothy Ivan Leong



# BIRDS-4 2019: Photo Album

Written By: Timothy Ivan Leong



# BIRDS-4 2019: Epilogue

Written By: Timothy Ivan Leong



As you could see from the previous pages, a lot happened in 2019. We learned a lot this past year and this invaluable experience will definitely be of use to us in the future.

2020 already seems like it will be even more busier for us as the launch of BIRDS-4 approaches.

We are working hard to make BIRDS-4 a success and hope that 2020 will only be good news from here onward.

Let's look forward to the new year!



# A Glimpse of Store and Forward Software Design Challenges



Yasir M. O. Abbas  
January 5, 2020



# A Glimpse of Store and Forward Software Design Challenges

Written By: Yasir Abbas

The Store and Forward mission (SFWARD) is one of the most important tasks that the BIRDS satellites perform.

The basic idea is to collect (store) data from distributed sensors and downlink (forward) it to the main ground stations.

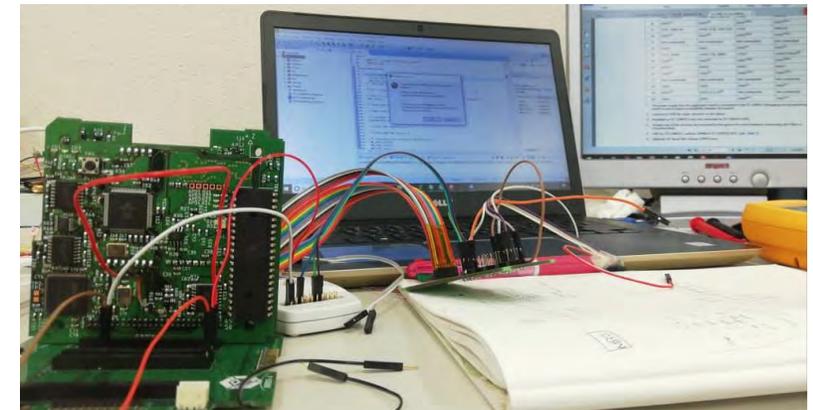
As there is a new BIRDS project every year, a different generation of engineers is building to the previous generation's systems. Due to that, these systems have to be upgrade-friendly. The software part of the system is more critical to be easily understandable by the next project's team so they can get the full experience of the predecessors then they continue to make the system better. In this briefing, I will quickly discuss some of the design challenges I encountered during the SFWARD code development.

Thinking about the coming engineer to work on the code vs do it the easy way does affect the design approach I used. Starting from the structure of the code to naming the variables.

Dealing with the SPI Memory is tricky, designers have to decide when, where and how will the received data be saved. This is more of data management than software coding. The saving task as well needs to be smooth after power cycles. If the sensor data has fixed size it would be a greater blessing, but accepting variable length of data is better coding that builds more flexible software.

As we are using APRS packets, multiple packet reception is expected, dealing with that adds many scenarios for the designer to balance between memory management and not losing data.

To optimize the power usage and maintaining reliable communication with the remote SFWARD sensors ground station the satellite and the ground terminal have to know the communication window timing. That adds the challenge of updating the orbit characteristics every now and then.



*My work environment*

# Laboratory's Annual *Bowling Event*



Hoda El-Megharbel  
January 5, 2020



# Laboratory's Annual Bowling Event

Written By: Hoda El-Megharbel

Before the year ends, LaSEINE members; staff and students, prepare for the annual bowling competition. On December 20, we had this year's event. This article will capture some of the moments and memories kept from that night.



*Plan, focus on your target -  
Marloun Sejera*



*Watch it's happening - Adolfo Jara*



*Practicing before the game begins*



*Trying hard - Hasif Bin Azami*



# Laboratory's Annual Bowling Event



*Participating Birds-4 members' photo*



*Best Player Award: A big package of Japanese Rice!*



*A group photo*



*Professors and students; everyone competes.*



*Winning team's celebration*

## 29. IAA African Symposium on Small Sats, 11-14 May 2020, South Africa



1st **IAA** AFRICAN SYMPOSIUM ON SMALL SATELLITES  
11-14 MAY 2020 | STELLENBOSCH | SOUTH AFRICA

*Space for Sustainable Development in Africa*

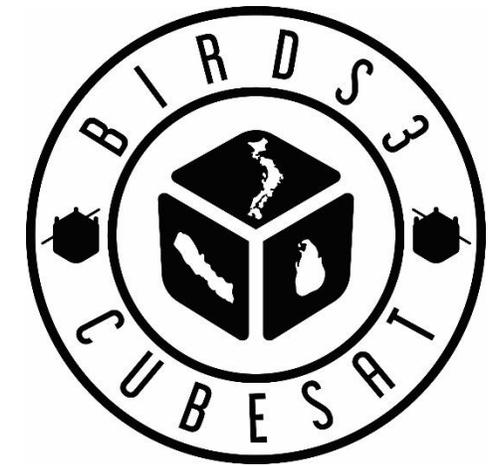
**ABSTRACT DEAD LINE IS 31 January 2020**

### Key dates

Registration Opens:	1st Nov. 2019
Abstract Submission Opens:	1st Nov. 2019
Abstract Submission Closes:	31st Jan. 2020
Notification to Authors:	17th Mar. 2020

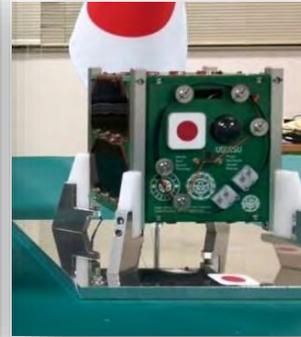
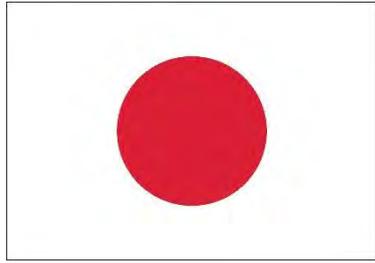


Symposium website: <https://www.iaa-africa2020.co.za/>



# BIRDS-3 Image Gallery

by the BIRDS-3 Team  
15 Jan. 2020

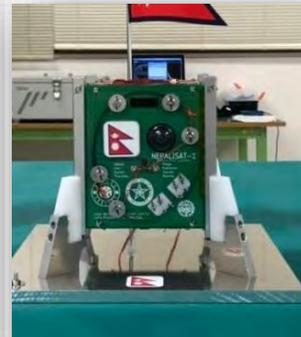
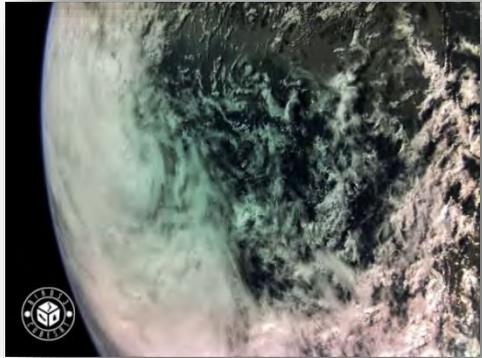


STATUS

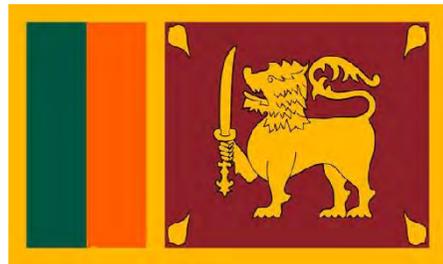


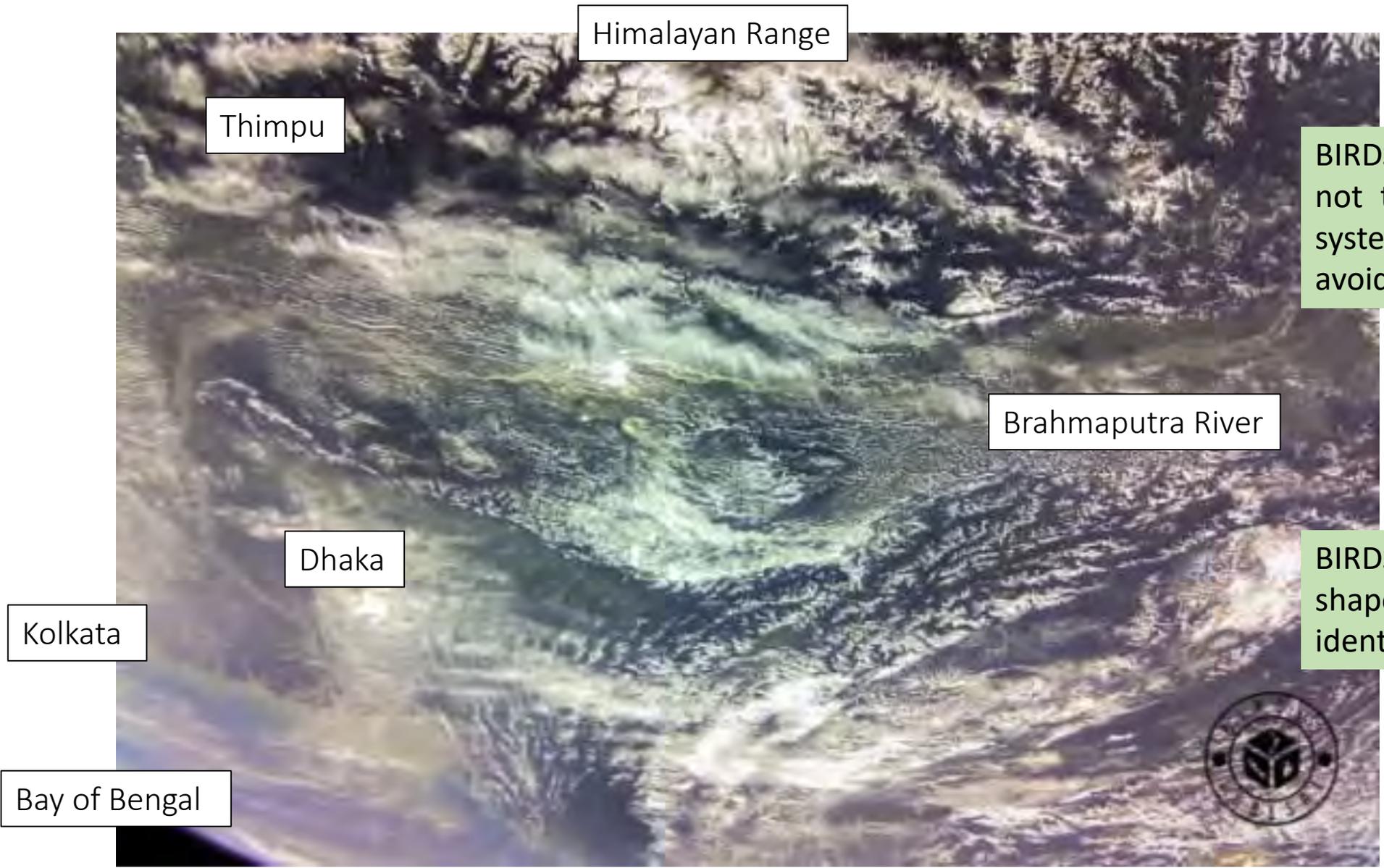
Taking Images from Space

BIRDS-3's primary mission is to take images for the purpose of media outreach. Each satellite is capable of taking 640x480 resolution images giving it a Ground resolution of 1.2km



**Capitals of BIRDS countries taken:**  
Thimpu (Bhutan)  
Dhaka (Bangladesh)  
Ulaanbaatar (Mongolia)  
Colombo (Sri Lanka)  
Accra (Ghana)

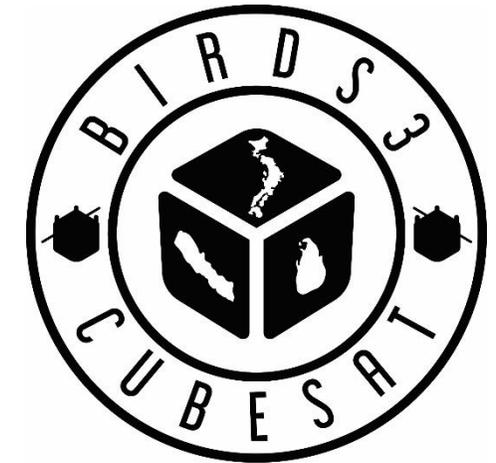
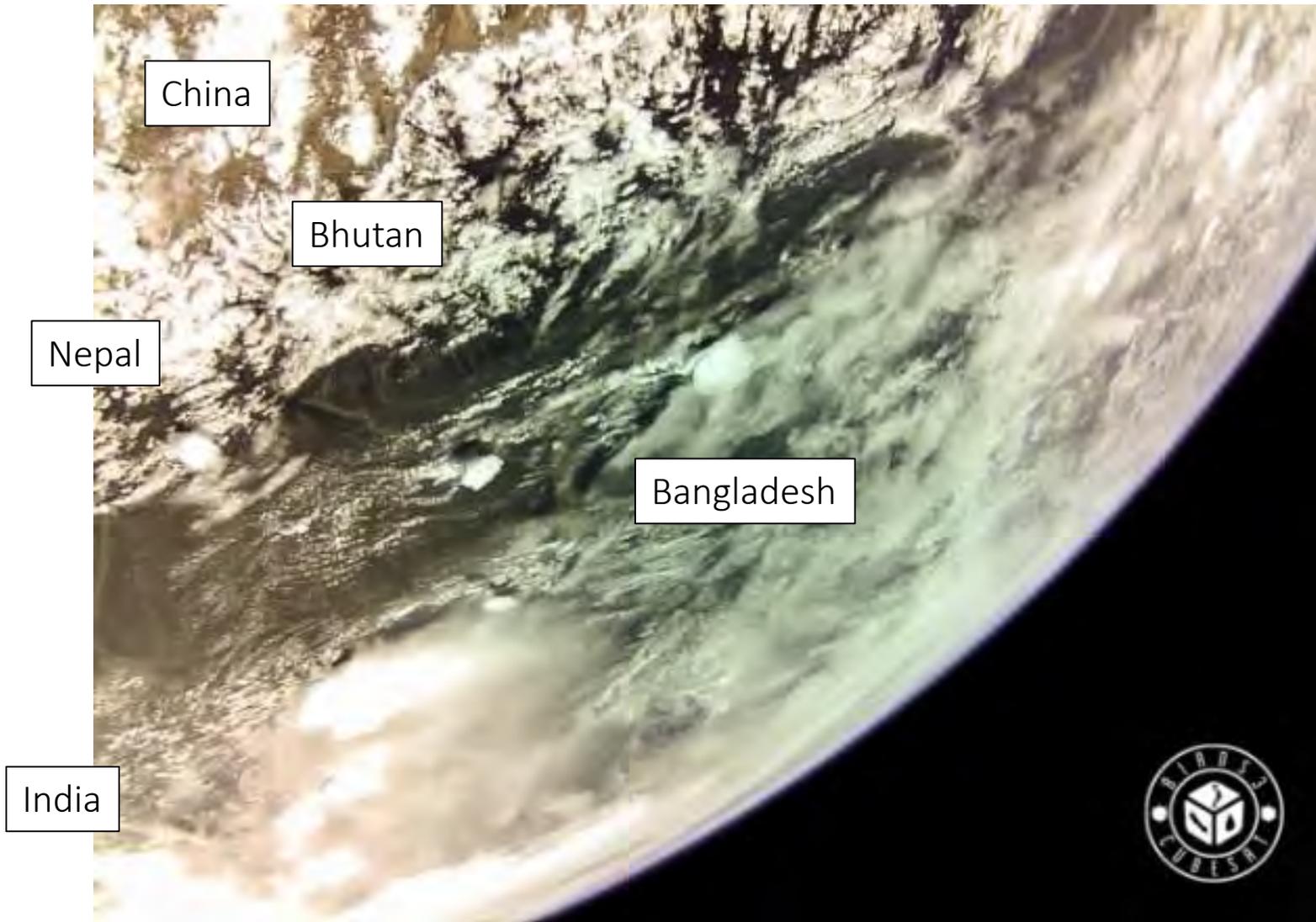




BIRDS-3's CAM MSN is designed not to be reliant on any other system to provide information to avoid tightly coupled systems.



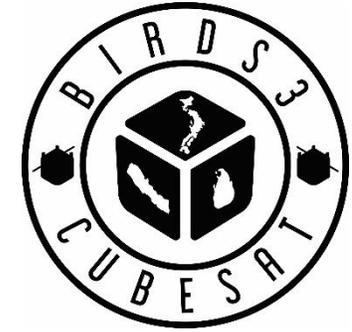
BIRDS-3 team uses landmass shape, rivers and ice caps to identify the location



BIRDS-3 full success criteria:

To image of Indian Subcontinent  
with either **Sri Lanka** or **Nepal**

Success Criteria Achieved



BIRDS-3 has been leveraging the GS network to send command from countries all around the globe. This command was sent from Information and Communication Ministry of Bhutan.

India



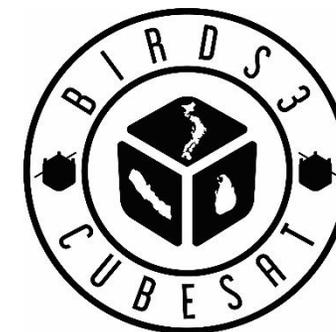
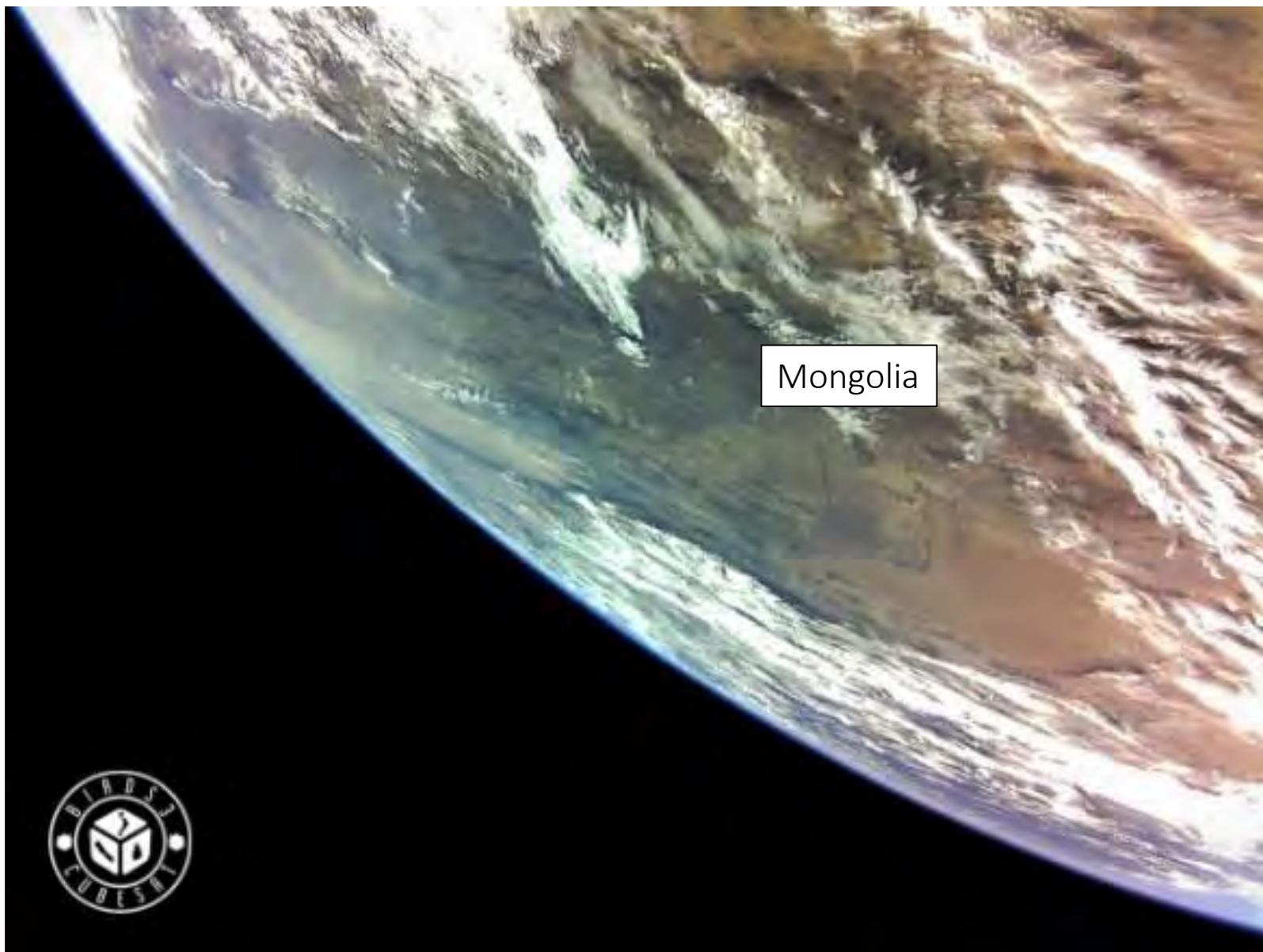
Sri Lanka

Indian Ocean

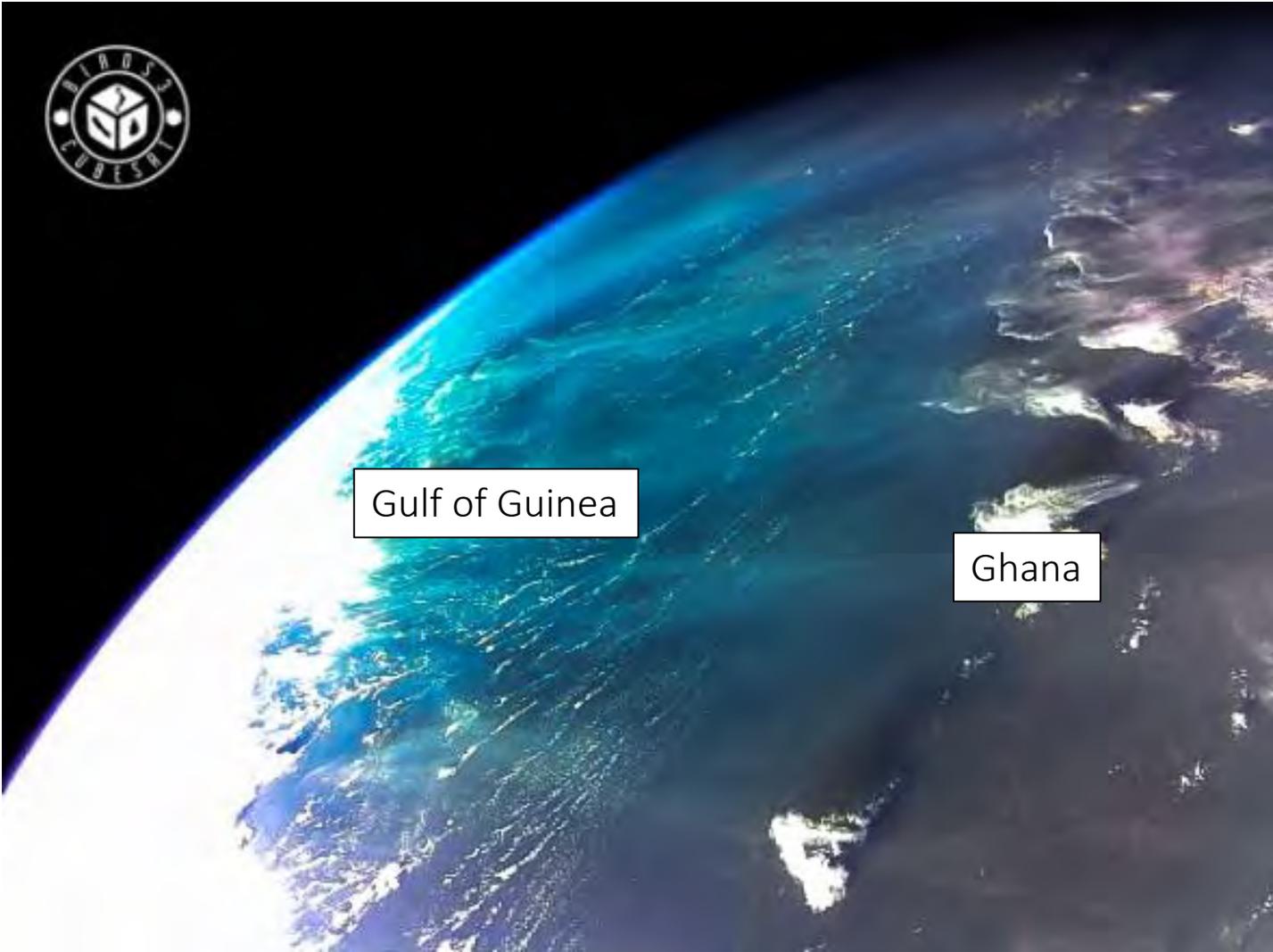


BIRDS-3 full success criteria:  
 To image of Indian Subcontinent  
 with either **Sri Lanka** or **Nepal**

Success Criteria Achieved

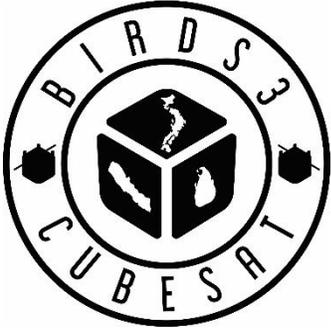


BIRDS-3 has been leveraging the GS network to send command from countries all around the globe. This command was sent from National University of Mongolia.



Gulf of Guinea

Ghana



BIRDS-3 has been leveraging the GS network to send command from countries all around the globe. This command was sent from All Nations University of Ghana

**End of updates from BIRDS-3**



# UPDATES FROM THE PHILIPPINES

**January 15, 2020**

University of the Philippines-Diliman  
Quezon City, Philippines

**PREPARED BY:**

**Mae Ericka Jean C. Picar**  
STAMINA4Space Communications Officer, STeP-UP Project  
Graphic Artist and Contributing Writer

**Nicole V. Ignacio**  
STAMINA4Space Information Officer, PHL-50 Project  
Contributing Writer and Editor

**F. Mara M. Mendoza**  
STAMINA4Space Project Manager, STeP-UP Project  
Contributing Writer and Editor



# DOST-ASTI, UP researchers win MIC6

December 02, 2019

*Koshiba Hall, Hongo Campus, the University of Tokyo, Tokyo, Japan*

DOST-ASTI and UP researchers won the first prize during the 6th Space Mission Idea Contest (MIC6) in Japan. The MIC6 was held on December 2, 2019 as part of the 7th University Space Engineering Consortium-Global (UNISEC-Global) Meeting. Their work focused on capturing and mapping the digital divide in space using radio frequency spectrum measurements and is entitled "Spectrum Monitoring from Space with i-SEEP (SMoSiS) - Capturing and Mapping the Digital Divide from Space through Radio Frequency Spectrum Measurements".

The Philippines has previously won 2nd place in MIC2 (2012) with the research entry "Thermal Infrared Remote Sensing Using Nano-Satellites for Multiple Environmental Applications." The researchers were also from the University of the Philippines, namely Edgardo G. Macatulad, Ed Carla Mae A. Tomoling and Mylene J. Villanueva.



*In photo: (L-R) Authors of the research : Mr. Calvin Artemies Hilario, Mr. Mar De Guzman, Ms. Genedyn Mendoza, and DOST-ASTI Acting Director Dr. Joel Joseph Marciano, Jr.*

*Photo courtesy of GMA News Online*

# STAMINA4Space Program opens call for 2nd batch of scholarships

January 6, 2020

*UP Diliman Electrical and Electronics Engineering Institute*

The Space Science and Technology Proliferation through University Partnerships (STeP-UP) Project opened the call for the second batch of applications to the Master of Science (MS)/Master of Engineering (MEng) in Electrical Engineering (EE) under the nanosatellite engineering track.

A group comprised of eight (8) individuals will be selected as part of the second batch, and the classes will start on August 2020. The graduate program, which is supported by the DOST-Science Education Institute (SEI), aims to develop and launch two (2) more cube satellites by 2022.

The current STeP-UP scholars posed for a photo wearing their lab gear while taking a break from their cube satellite tests at the University Laboratory for Small Satellites and Space Engineering Systems (ULYS<sup>3</sup>ES), located in UPD-EEEI.



# Minister Naokazu Takemoto's PH visit

January 8, 2020

*University Laboratory for Small Satellites and Space Engineering Systems*

Department of Science and Technology (DOST-Philippines) Secretary Fortunato de la Peña met with Minister Naokazu Takemoto, a member of the House of Representatives for Osaka 15 who handles matters on Japan's State for S&T and State for Space Policies. His visit included the Bilateral Meeting on Science Technology & Innovation Cooperation at the ULyS<sup>3</sup>ES-1, Electrical and Electronics Engineering Institute in UP Diliman and a visit to the facilities in ASTI. During the meeting, both Secretary de la Peña and Minister Takemoto assured that the Philippine-Japan collaboration in Science Technology & Innovation will continue and will be further expanded.



*In photo: (above) attendees during the bilateral Meeting on Science Technology & Innovation Cooperation: DOST Secretary Fortunato de la Peña, Japan Minister for S&T and Space Policy Naokazu Takemoto, Deputy Director General for International Cooperation Mr. Takeshi Ikeda, DOST Assistant Secretary for International Cooperation Dr. Leah J. Buendia, DOST-PCIEERD Director Dr. Eric Paringit, and DOST-ASTI Director Dr. Joel Joseph Marciano, Jr.*

# Dr. Marciano selected as Philippine Space Agency's First Director General

January 7, 2020

The STAMINA4Space Program and the DOST-Advanced Science and Technology Institute are honored and privileged to have its leader, Dr. Joel Marciano Jr., selected by President Rodrigo R. Duterte as the first Director General of the Philippine Space Agency (PhilSA).

The Director General of PhilSA is appointed by the President of the Philippines and is subject to the confirmation by the Commission on Appointments.



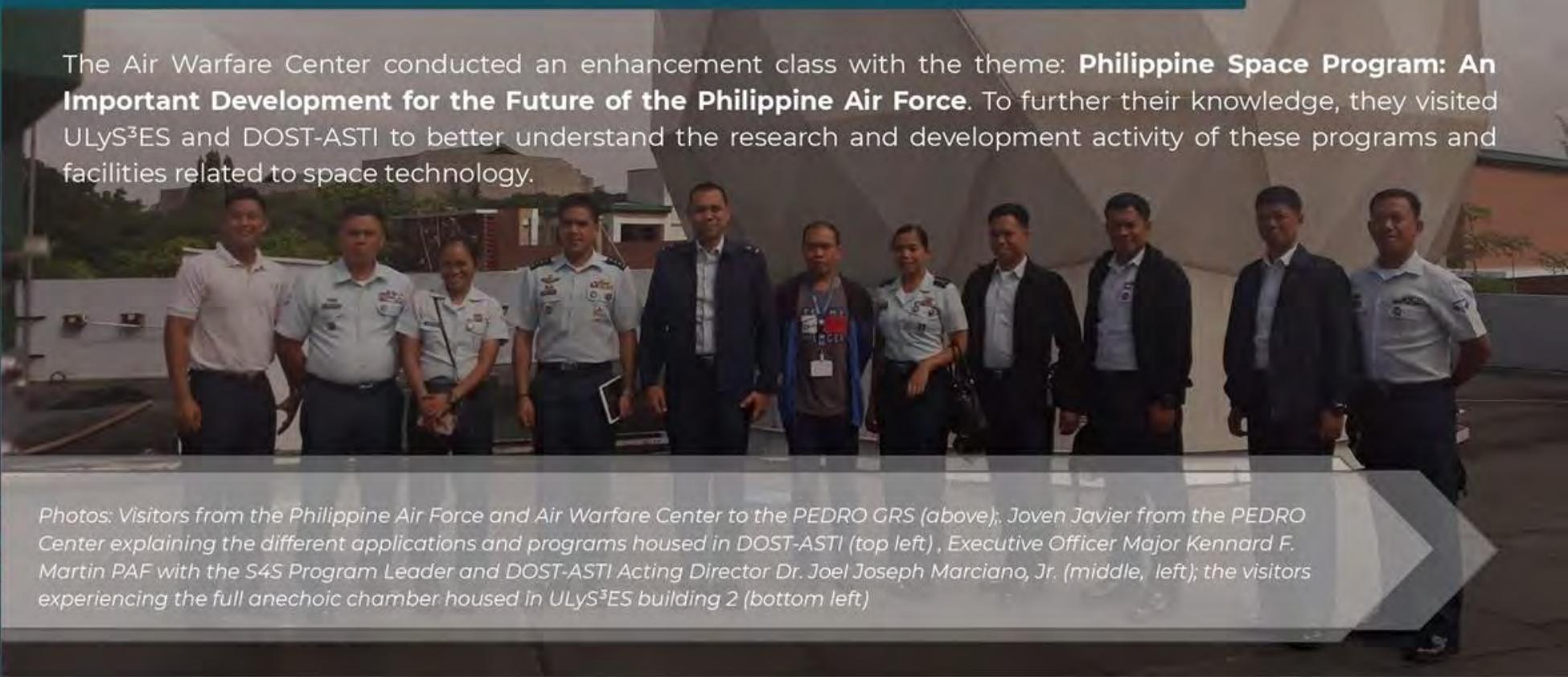


# The Philippine Air Force Air Warfare Center Personnel visits ULyS<sup>3</sup>ES and DOST-ASTI

January 10, 2020  
UP-EEEI and DOST-ASTI



The Air Warfare Center conducted an enhancement class with the theme: **Philippine Space Program: An Important Development for the Future of the Philippine Air Force.** To further their knowledge, they visited ULyS<sup>3</sup>ES and DOST-ASTI to better understand the research and development activity of these programs and facilities related to space technology.



*Photos: Visitors from the Philippine Air Force and Air Warfare Center to the PEDRO GRS (above); Joven Javier from the PEDRO Center explaining the different applications and programs housed in DOST-ASTI (top left), Executive Officer Major Kennard F. Martin PAF with the S4S Program Leader and DOST-ASTI Acting Director Dr. Joel Joseph Marciano, Jr. (middle, left); the visitors experiencing the full anechoic chamber housed in ULyS<sup>3</sup>ES building 2 (bottom left)*

# 2019 Year-end Celebration

December 13, 2019

ULyS3ES Building

The STAMINA4Space Program concluded 2019 with a year-end celebration on 13 December 2019. The theme selected was Star Wars.

*Wishing you a prosperous  
and successful 2020,  
BIRDS Network!*

*-STAMINA4Space team*



# Updates from STEP-UP scholars.

*"The ninth step..."*

January 15, 2020

University of the Philippines- Diliman  
Quezon City, Philippines

*Prepared by STeP-UP scholars*

**Renzo S. Wee | Christy A. Raterta**  
Layout Designer | Contributing Writer

**Judiel L. Reyes**  
Contributing Writer

**Gladys A. Bajaro**  
Contributing Writer

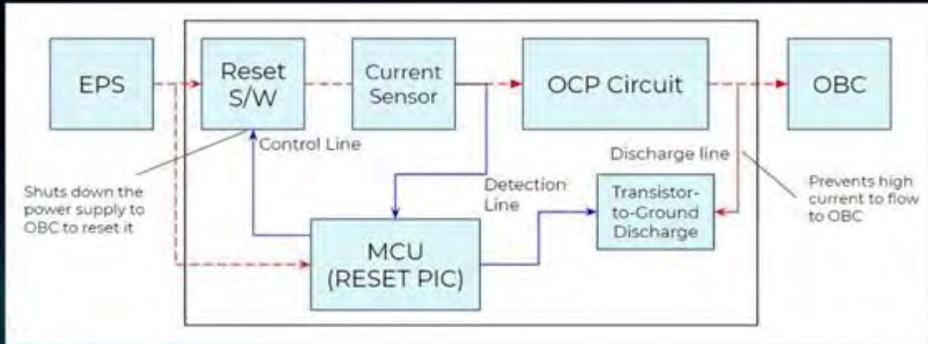
**Derick B. Canceran**  
Contributing Writer

**Bryan R. Custodio**  
Project Manager  
Contributing Writer

**Marielle M. Gregorio**  
Contributing Writer

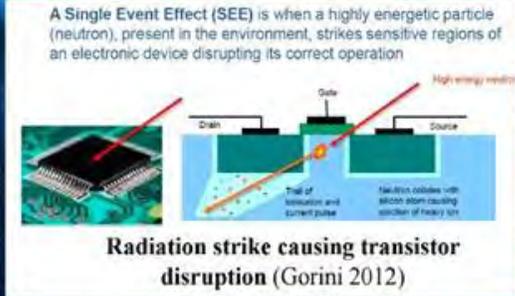
# S.E.L.P. Functionality Test

-Marielle Gregorio



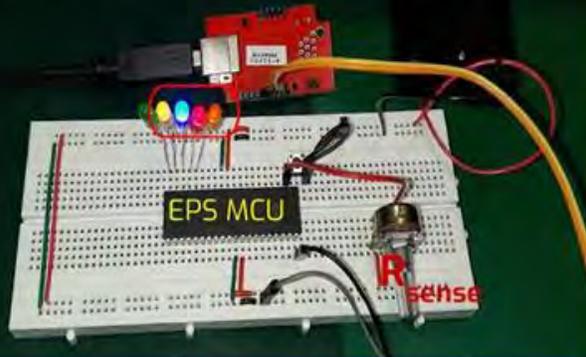
SELP, short for Single-Event Latchup Protection, is a function of the Electrical Power System of the cube satellite that ensures the satellite to operate safely when SEL occurs while in operation.

The SELP circuit prevents the high current to enter the sensitive electronic components like the OBC by setting the threshold current that enters into the OBC, the current limiting circuit detects the increase of the current at OBC junction, forces a shutdown (discharge to ground) of the OBC for a few seconds to reset the component and return to normal operation.



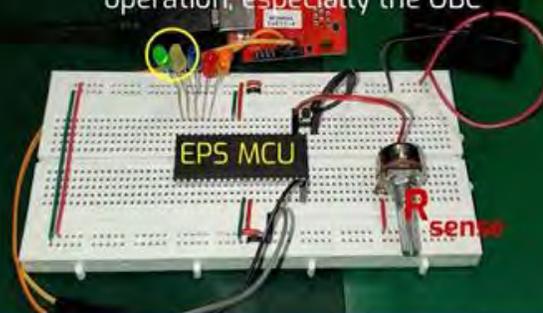
Single-Event Latchup (SEL) is a Single-Event Effect (SEE) encountered by spacecrafts wherein electronic components such as the onboard computer (OBC) experience intermittent or permanent high current caused by heavy ions or protons from cosmic rays or solar flares.

Before SEL, normal EPS operation



LEDs represent RF\_Power (yellow), 3.3V (blue), 5.0V (red), and Unreg (orange) supply lines

During SEL, RESET PIC sends signal to transistor at junction before OBC to discharge current and switches off power supply outputs to reset the operation, especially the OBC



Green LED represent Discharge signal line; Current threshold set to 100mA

```

COM6 - Tera Term VT
File Edit Setup Control Window Help
***** THIS IS RESET PIC EM VERSION V1 *****
PIC started
unreg :255
check_flag :255
Waiting to turn ON UNREG
UNREG ON for the burn
UNREG OFF after the burn
hour:0 min:1 SEC:4 Main Loop Started
current in mili amp 100.545128
current adc 624

Latch up Occur
hour:0 min:1 SEC:53
current in mili amp 104.573368
current adc 649

Latch up Occur
hour:0 min:1 SEC:56
    
```

Latchup occurred when MCU reads the current at pin 2 of MCU is beyond the threshold

# Soiree of laughter, tears, and relaxation

-STEP-UP scholars



*Sea breeze, sunkissed and salty air. Creating new memories for the new year. - Gladys*



*Had a great time visiting the museum with friends - Derick*



*Had a time to reboot, refresh, and rebuild my mind. - Bryan*



*I spent the holidays with my family in the province. It is the best time to reboot one's soul! -Lorilyn*

# Soiree of laughter, tears, and relaxation

-STEP-UP scholars



*I spent the year-end holidays in Bohol with my family, reunited with my 2 kids to inspiringly kickstart my 2020 - Marielle*



*Spent the holidays in my province, there is no place like home! -Jude*



*I spent the holidays with the fam! We celebrated Christmas and New Year's eve at home, visited some places where we used to go to, and learned some life-hacks. Also, I was able to tick (partially) an item on my 2020 bucket list: create new memories. \*wink\* - Christy*



*I spent the holidays in my hometown -- refreshing my mind! - Renzo*



*Gladys is an electronics engineer hailing from the land of the great mountain of Mayon.*

*She has ventured in the field of space engineering and science the longest among the group. She served as an engineer of PHL-Microsat, mastering ground station operations. She also took a job of being a project manager in One-Comm.*

*All these achievements and yet, she remained to be one of the most humble person the group has known. Having a sweet voice, she is someone anyone can talk to easily. Although, she takes her tasks seriously, she does not forget to enjoy her journey -- having fun while at it! A lovely person indeed!*



*Feliz Compleaños, sadit pero magayon!*



*Celebrating Gladys' birthday!*

<https://favpng.com/>

# End of this **BIRDS Project Newsletter**

(ISSN 2433-8818)

## Issue Number Forty-Eight

This newsletter is archived at the BIRDS Project website:

<http://birds1.birds-project.com/newsletter.html>

**You may freely use any material from this newsletter so long as you give proper source credit (“BIRDS Project Newsletter”, Issue No., and pertinent page numbers).**

When a new issue is entered in to the archive, an email message is sent out over a mailing list maintained by the Editor (G. Maeda, Kyutech). If you wish to be on this mailing list, or know persons who might be interested in getting notification of issue releases, please let me know.

This newsletter is issued once per month. The main purpose of it is to keep BIRDS stakeholders (the owners of the satellites) informed of project developments.

