



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, -4 and -5, on 30-Oct-2020 in front of the lab building

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

All back issues are archived at this website.

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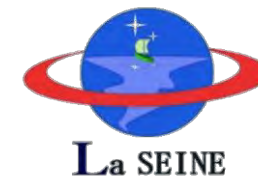
BIRDS Project Newsletter

Issue No. 68
(21 Sept. 2021)

Edited by:

G. Maeda

革新的宇宙利用実証ラボラトリー
*Laboratory of **Lean Satellite Enterprises**
and **In-Orbit Experiments (La SEINE)***
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.

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The Guest Box From Malaysia



Source: flyklia.com

Location: Langkawi Sky Bridge, Langkawi Island, Kedah, Malaysia
Langkawi is an island located in the northern state of Malaysia, Kedah. One of the main attractions in the island is this 410 feet long Sky Bridge that is located at Mount Mat Chinchang, around 2,200 feet above the sea level. The visitors are required to take the cable car for approximately 15 minutes to reach the bridge.

**By Fatimah Zaharah Ali (UiTM, Malaysia)
(My hometown is in Kedah.)**

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Dr Yasir Abbas (shown above with his wife Samah on 14-SEPT-2021) has successfully completed his Phd under SEIC/PNST and will soon return to his homeland of Sudan.

Congratulations, Yasir!

Here are two BPN articles related to him:

Self Intro

Pages 136-139, Issue No. 38

Member of BIRDS-4 ICU team

Pages 94-97, Issue No. 53

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.

JSPS provides the airfare funds of BIRDS International Workshops and for Ground Station Workshops.



01. 2022 UN/Kyutech PNST is now open for applications (space engineering scholarships)



UNITED NATIONS
Office for Outer Space Affairs



NOW ACCEPTING APPLICATIONS

About Us ▾ Our Work ▾ Space4SDGs ▾ Information for... ▾ Events ▾ Space Object Register ▾

Our Work > Programme on Space Applications > Basic Space Technology Initiative (BSTI) > Fellowship Programme

Basic Space Technology Initiative Fellowship Programme

United Nations/Japan Long-term Fellowship Programme 2022
Post-graduate study on Nano-Satellite Technologies (PNST)
(Kitakyushu, Japan)

Updated 25 August 2021

**Applications are accepted until
10 January 2022 (Monday, 23:00 JST).**

ALL INFO IS HERE: <https://www.unoosa.org/oosa/en/ourwork/psa/bsti/fellowships.html>

**A full
scholarship
for six
graduate
students**

**Cont'd
on the
next
page**



The United Nations Office for Outer Space Affairs and the Government of Japan in cooperation with the Kyushu Institute of Technology (Kyutech) have established a United Nations/Japan Long-term Fellowship Programme on Nano-Satellite Technologies for nationals of developing countries or non-space-faring nations. The Programme will provide extensive research opportunities in nano-satellite systems through the use of the [nano-satellite development and testing facilities](#) available at Kyutech.

Every year this "Post-graduate study on Nano-Satellite Technologies (PNST)" Fellowship Programme will accept up to three students in the Master's Program (2 years duration) and up to three students in the Doctoral Program (3 years duration). Successful participants will be awarded a master or doctoral degree after successful thesis defence. The successful candidates will enroll in the Space Engineering International Course (SEIC) after passing an official entrance examination by the Graduate School of Kyushu Institute of Technology.

The selected candidates will each receive a grant under Japanese government (Ministry of Education, Culture, Sports, Science and Technology: MEXT) scholarship (Research Students) of approximately 144,000 JPY per month for the duration of their fellowship study (2 or 3 years) to cover housing, food, local transportation, and other expenses. Each candidate will be provided, according to his/her itinerary and route as designated by MEXT, an economy class air ticket between an international airport in the country of his/her nationality and an international airport in Japan used on the normal route to the accepting university. Fees for matriculation, tuition and entrance examinations will be paid by Kyutech.

If you are an engineer under age 35 living in a non-space-faring nation and you are *passionate* about space, then you have a good chance at PNST; you should apply.

How satellite technology has opened new opportunities:

From El Salvador to the world

Interview conducted on 25 August 2021

Institution:



Interviewee: Fatima Duran, Master's Student at Kyushu Institute of Technology from the Republic of El Salvador

Background:

The [United Nations Office for Outer Space Affairs \(UNOOSA\)](https://www.unoosa.org/), in partnership with the Government of Japan and the [Kyushu Institute of Technology \(Kyutech\)](https://www.kyutech.ac.jp/) offers the [UN/Japan Long-term Fellowship Programme Post-graduate student on Nano-Satellite Technologies \(PNST\)](https://www.unoosa.org/documents/pdf/psa/bsti/fellowship/2022/Interview_Article_PNST2021_Fatima_Duran.pdf).

READ THE ENTIRE INTERVIEW HERE:

https://www.unoosa.org/documents/pdf/psa/bsti/fellowship/2022/Interview_Article_PNST2021_Fatima_Duran.pdf

To help promote the Year 2022 round of PNST, UNOOSA interviewed PNST student Fatima of El Salvador

Interview:

How did you learn about the PNST fellowship and where were you at the time in your studies and career?



Flight Dynamics practice on a CTWS flight design training airplane ©Fatima Duran



I have always been interested in aerospace engineering. However, since there was no university that taught aerospace engineering in En Salvador at that time, I studied aeronautics first in my country, at Universidad Don Bosco. With that experience, I moved to South Korea to obtain my bachelor's degree in Pusan National University. In South Korea, not only did I have the opportunity to study aerospace engineering at university, but I had the privilege to take part in the 2017 International Space Training that was conducted by the Korean Aerospace Research Institute (KARI). KARI invites delegates from developing countries to this programme and I was very fortunate to be given this opportunity. It was a wonderful 2-week course to gain theoretical training about remote sensing and GEO satellite technology, have the chance to participate in technical visits to actual testing facilities in KARI's



A sample from the interview



Soldering some components of the LoRa receiver ©Pooja Lepcha

Would you recommend PNST to other people? If so, what would be your advice to them?

I would definitely recommend PNST. Kyutech is a leading institute in the field of nano-satellite technology. They have an organized programme where you can gain experience through hands-on opportunities and learn about the complete life cycle of the development of a satellite. Kyutech proudly holds the position as top in the number of academic small satellites by academic and non-profit institutions, according to the “Smallsats by the Numbers 2020” provided by Bryce Space and Technology. Furthermore, the prospects you gain from living in a different country, learning the culture/language and making friends from all over the world is a precious part of the experience that needs to be emphasized. Life in the lab with my international colleagues continuously brings me new findings, on how they work, approach problems and come to conclusions. Of course, with a new language and culture, life is not always easy, but Kyutech has an amazing support system from day 1, with a tutor that helps to set up necessities such as accommodation, bank accounts and so on.

A current PNST student (Pooja Lepcha of Bhutan) appears in a new video from UNOOSA



← *“50 years of the United Nations Programme on Space Applications”*
Aug 25, 2021



UNOOSA

FOUR-MINUTE VIDEO BY UNOOSA:

<https://www.youtube.com/watch?v=lqkXg6LqocM>

02. Three students of SEIC receive IAF ESL awards

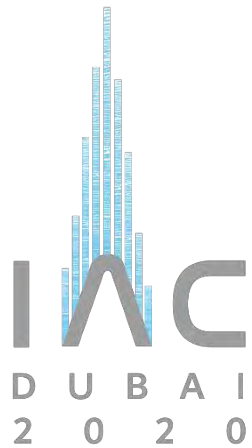
Congratulations to the following SEIC students

- ◆ Fahd (Morocco)
- ◆ Hari (Nepal)
- ◆ Pooja (Bhutan)

for winning ESL awards of the IAF. Only 25 are given each year by the IAF. See the page after next.



In 2019 (IAC in Washington, DC), four SEIC students received this prestigious award. For details, see [page 43 of BIRDS Project Newsletter #46](#) ... or see the next page of this issue.



ALL 25 ESL WINNERS ARE ANNOUNCED BY IAF (24-AUG-2021) :

<https://www.iafastro.org/news/the-iaf-is-proud-to-introduce-the-2021-iaf-emerging-space-leaders.html>

“These 25 students and young professionals were chosen by the IAF Emerging Space Leaders Sub-Committee composed of nine highly experienced space stakeholders. They will travel to Dubai in October 2021 to participate in the IAC and have the opportunity to extend their network, gain knowledge and meet space experts!” --- from the website.

2019: 120 applicants → 25 winners of ESL award of IAF
Washington, DC

IAF Emerging Space Leaders



Divya Rao Ashok
Kumar
India



Rigoberto
Reyes Morales
Mexico



Martin Ristov
Canada



Avid Roman
Gonzalez
Peru



Faviola Romero
Bolivia



Aqeel Shamsul
Malaysia

Out of 25, 4 winners are from Kyutech !



Yasir
(Sudan)

Izrael
(Philippines)

Femi
(Nigeria)



Fahd Moumni

MOUMNI Fahd, born the 14th of June 1997 in Casablanca, Morocco, has been pursuing a double Master's degree in Materials Sciences (EEIGM - Université de Lorraine) and Mechanical & Space Systems Engineering (Kyushu Institute of Technology) under the supervision of Prof. IWATA Minoru. Fahd speaks Arabic, French, English, Spanish, German, and Japanese.

Fahd is the structure team leader of the BIRDS-5 CubeSat Project. BIRDS Projects, led by Prof. CHO Mengu, are Multinational Projects aiming to build capacity for developing countries in space engineering. BIRDS-5 will launch Uganda and Zimbabwe's first ever satellites in addition to a Japanese payload developed with the Japan Aerospace Exploration Agency. As a fellow African, Fahd has been more than proud to take part in this adventure that will certainly catalyze the space sector of the continent.

Space is full of mysteries and International Cooperation is the only way to solve them: Solutions are found smarter and faster by bringing our diverse points of view together! Space Professionals must learn languages as communication is the essence of international cooperation! One might only have full faith in you if you speak his/her own language as it translates his/her mentality. In the BIRDS Project, using Japanese at times eliminated doubts and improved the project success rate. The future of space is in developing countries: Those countries have the envy to do great but they just need a small push! For Fahd, "Space is said to be for everyone, therefore, everyone should have access to it !"



Hari Ram Shrestha

Hari Ram Shrestha is a Nepalese Ph.D. student under the Laboratory of Lean Satellite Enterprises and In-Orbit Experiments (LaSEINE) at Kyushu Institute of Technology (Kyutech). He is taking Electrical and Space Engineering with the Japanese Government's (MEXT) scholarship through the United Nations/Japan long term Fellowship Programme (PNST). He has a Master's degree in Applied Science for Integrated Systems Engineering (SEIC) at Kyushu Institute of Technology. He has been part of different satellite projects in Kyutech such as BIRDS-41U CubeSats, 6U CubeSat, and a 3U CubeSat project. His work focuses in satellite's electrical power subsystem and backplane interface board design, development, test, and verification.

Furthermore, he has been involved in the planning and operation of the ground stations for the BIRDS 3 and BIRDS 4 satellites. He is a staff member of the Nepal Academy of Science and Technology (NAST). He worked in renewable energy, experimental training for science teachers, and operating the X-Ray Diffraction (XRD) system at the material science and nanotechnology unit. Following the 2015 big earthquake in Nepal, he worked for Nepal's GPS/GNSS station installation and data collection. With his contributions as one of the two developers of Nepal's first satellite, NepaliSat-1, he was awarded with the "Kirtimaya Rashtradeep Fourth Class 2076" medal from Nepal's Right Honorable President, Mrs. Bidya Devi Bhandari, on April 9, 2021.



Pooja Lepcha

Pooja Lepcha is currently pursuing her doctorate degree in Electrical and Space Systems Engineering at Kyushu Institute of Technology. She received a UN/Japan Long term fellowship “Post Graduate Studies on Nano Satellites (PNST)” to pursue a master’s degree and doctoral degree in Space Engineering at Kyushu Institute of Technology. She has a bachelor’s degree in Electrical Engineering from the College of Science and Technology, Bhutan. Back home, she works in the Division of Telecom and Space under the Department of IT and Telcom, Ministry of Information and Communication of Bhutan. During her master’s degree, she was part of the BIRDS-2 team and was involved in the development of the first satellite of Bhutan, BHUTAN-1. She was also part of BIRDS-3 team developed the first satellites of Nepal and Sri Lanka. She mainly works on the Electrical Power System (EPS) of the satellite. EPS is crucial for providing uninterrupted power to the satellite both during sunlight and eclipse. She is currently a member of a 6U satellite project called KITSUNE where she also handles the EPS of the satellite along with the Store and Forward mission. Her research is on the development of low-cost sensor stations for remote data collection using satellites, especially in developing countries. She is coordinating with 10 developing countries to build low-cost sensor stations and collect data from remote places in their own countries. After completion of her PhD, she aspires to engage in STEM education and more space activities in Bhutan.

03. MIC-7: Kyutech team is among the finalists



The screenshot shows the homepage of the 7th Mission Idea Contest. At the top left is a logo featuring a blue globe with a network of white lines and colorful dots. To its right, the text reads "The 7th Mission Idea Contest For Deep Space Science and Exploration". Below this is a horizontal navigation bar with seven colored buttons: Overview (pink), Requirements (orange), Schedule (yellow), Application (green), FAQ (blue), Contact (purple), and Lecture (magenta). The main content area is divided into a left sidebar and a main section. The sidebar contains a "News" section with a post dated February 28, 2020, and a "Links" section with the UNISEC-GLOBAL logo. The main section features a "Loading" indicator, a "Review Team | Regional Coordinators | Support Group" link, and a "Follow us on" link with a Facebook icon. The main heading is "Introduction to the Mission Idea Contest", followed by a paragraph describing the contest's purpose and a paragraph about the development of micro/nano-satellites.

The 7th Mission Idea Contest
For Deep Space Science and Exploration

[Overview](#) [Requirements](#) [Schedule](#) [Application](#) [FAQ](#) [Contact](#) [Lecture](#)

[Review Team](#) | [Regional Coordinators](#) | [Support Group](#) Loading

News

- February 28, 2020
First announcement of the 7th Mission Idea Contest

Links


[UNISEC-Global](#)

Introduction to the Mission Idea Contest

[Follow us on](#) 

The Mission Idea Contest (MIC) was established in 2010 to provide aerospace engineers, college students, consultants, and anybody interested in space with opportunities to present their creative ideas and gain attention internationally. The primary goal of MICs is to open a door to a new facet of space exploration and exploitation.

Development of micro/nano-satellites started as an educational and research program primarily at university laboratories. As the micro/nano-satellite technology matures, it has spread rapidly across the academics and industry for practical application.

Go to the source: <http://www.spacemic.net/index.html>

The finalists --- announced on 27 August 2021

Title	Authors	Affiliation	Country
Finalist			
Hermes CubeSat: on-site data gathering for accurate mapping of the Main Asteroid Belt.	Marti Pujol Gasulla	Kyushu Institute of Technology	Japan
MINERVA: A 6U Nanosatellite with an Autonomous Intelligent Biological Operating System (AIBO) for Deep-Space Experiment	Sumeth Klomchitcharoen	Mahidol University	Thailand
Mission ACE: Apophis Close Encounter	Ying Liao	National Central University	Taiwan
PARS: Precursor Asteroid Remote Survey	Batu Candan	Middle East Technical University	Turkey
Disrupting Herpes virus investigation in lunar orbit: A system for animal cells analysis	Kevin Andrey Sanchez Ramirez	Universidad de Costa Rica and Instituto Tecnológico de Costa Rica	Costa Rica

An entry from Kyutech is a finalist

The 7th

Mission Idea Contest

For Deep Space Science and Exploration

The **7th Mission Idea Contest** for Deep Space Science and Exploration with Nano/Micro Satellite will be held as follows:

Schedule

October 23, 2020	Restart announcement
Feb 15-Mar 19, 2021	Virtual Lectures
July 21, 2021	Deadline of Abstract submission
August 18, 2021	Notification of Finalists
September 30, 2021	Deadline of Final Paper submission
November 13, 2021	Final presentation (probably in Tokyo)

Observation of Telomere Length Changes in Deep Space Radiation Environment	Jose Leonardo Brenes, David Limpus, Dayanna Vargas, Maria Fernanda Guerrero, Marlon Narvaez	Vanderbilt University, Universidad de Costa Rica, Universidad Autónoma de Centroamérica	USA, Costa Rica, Nicaragua
SCORE: Observation and Exploration of a Long Period Comet using Micro-Satellites	Vincenzo Porrino	University of Naples Federico II	Italy
ILNSS : Network for position on Lunar surface and interplanetary prototype	Thanapat Chotipun	Bodindecha (Sing Singhaseni) School	Thailand
Melchior - Microsatellite Explorer to a Long-period Comet in a Heliocentric Inner Orbit	Luigi Falanga	University of Naples Federico II	Italy
The Hilda Observer Test (THOT) mission	Cristian Chavez	University of Southern Queensland	Australia

SCOPE OF THIS MISSION IDEA CONTEST



Since the publication of Tsiolkovsky's rocket equation in 1903, and the genesis of modern rocketry ushered by Goddard's experiments with liquid-propellant rockets; humanity has achieved remarkable feats of space research and exploration that were once only dreams. Advancements in technology, coalesced with our curiosity of the unknown and our tenacious spirit in overcoming challenges; space capability, missions, and applications have progressively become more sophisticated, extending our capabilities in the field of deep-space exploration. Considerations such as the implementation of the Gateway project and unprecedented levels of advancement in technical proficiency, will contribute to the frequency and ease at which deep-space missions can be undertaken.

To achieve mission objectives, deep space missions require the development of mission specific components from the base up. Often with long-term mission objectives in mind, deep space missions encourage us to challenge our own limitations and deepen our understanding; facilitating continuous learning and inspiring our imaginations to create real-world space applications. The 7th Mission Idea Contest on Deep Space Science and Exploration with Micro/nanosatellites seeks to build the technical knowledge and skills, including mission design and scientific writing skills, required to deliver opportunities for the development of practical deep-space missions that is not dominated by developed nations through the identification of the required technology and innovation to achieve deep-space exploration projects with micro/nanosatellites.

END OF THIS SECTION

04. BIRDS-2S satellites were successfully launched on a SpaceX Falcon-9 rocket

LAUNCH SUCCESS!

The Philippines' third and fourth cube satellites, the MAYA-3 and MAYA-4 (aka, BIRDS2-S), were successfully launched. The Philippines' Maya-3 and Maya-4 1U satellites are now bound to the ISS aboard SpaceX Falcon 9 rocket. The two low-Earth-orbit CubeSats are the first PH university-built satellites developed by Filipino engineers



ONE-MIN. VIDEO:

<https://www.youtube.com/watch?v=YHUjs7BvmZY>

CRS-23 Mission

The video below covers the launch of the rocket that carried MAYA-3 and MAYA-4 into space. In this video, during 8:50-15:15, some of the other payloads/missions going to the ISS are explained. This rocket was launched on 29 August 2021 after a one-day delay due to weather.



42-MIN. VIDEO

<https://www.youtube.com/watch?v=x-KiDqxAMU0>

CubeSats aboard CRS-23 to the ISS

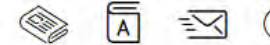
- ❑ PR-CuNaR2 - CubeSat NanoRocks2, Inter American University of Puerto Rico
- ❑ Amber IOD-3 – Horizon Space Technologies, U.K.
- ❑ Binar-1 – Space Science and Technology Centre, Curtin University, Australia
- ❑ CUAVA-1 – ARC Training Centre for CubeSats, UAVs & Their Applications, HQ @ The University of Sydney, Australia
- ❑ CAPSat - Cool Annealing Payload Satellite, University of Illinois at Urbana-Champaign, USA
- ❑ **Maya-3 and Maya-4 – University of the Philippines-Diliman and Kyushu Institute of Technology, Japan**
- ❑ SPACE HAUC – Science Program Around Communications Engineering with High Achieving Undergraduate Cadres, University of Massachusetts Lowell, USA

https://en.wikipedia.org/wiki/SpaceX_CRS-23



MANILA BULLETIN

LATEST
NEWS



National Metro Luzon Visayas Mindanao World

More from us: mbcn.com

NEWS / NATIONAL / PH's first university-built cube satellites to be launched to Int'l Space Station Aug. 28

National, News

PH's first university-built cube satellites to be launched to Int'l Space Station Aug. 28

<https://mb.com.ph/2021/08/28/maya-3-maya-4-phs-first-university-built-cube-satellites-to-be-launched-to-iss-aug-28/>

MANILA BULLETIN

05. Launch of BIRDS-2 was covered on Manila STV



DOST-ASTI/JAXA

MAYA-1 MISSIONS

- Collect data using a remote data collection system (RDCS) called the Store and Forward (S&F).
- Gather data from remote ground systems within its path.



Rep of the Japan Embassy (Manila)



Watching the countdown in Manila



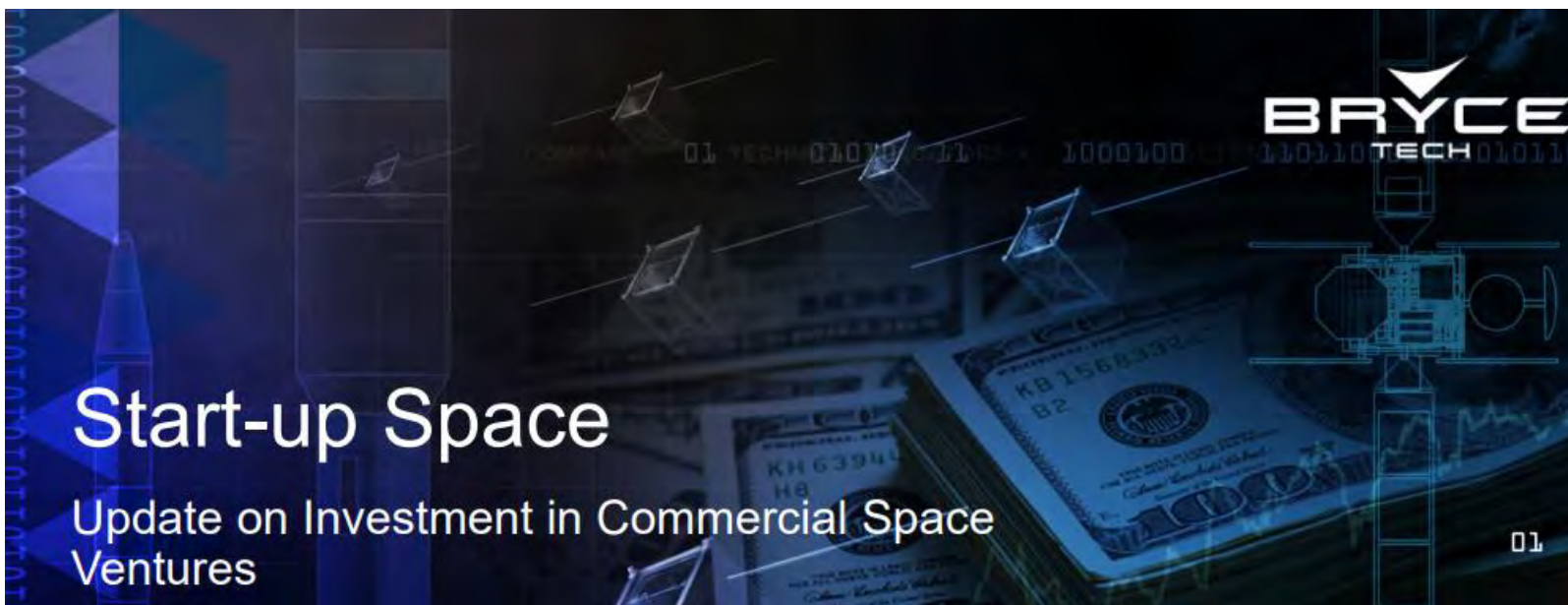
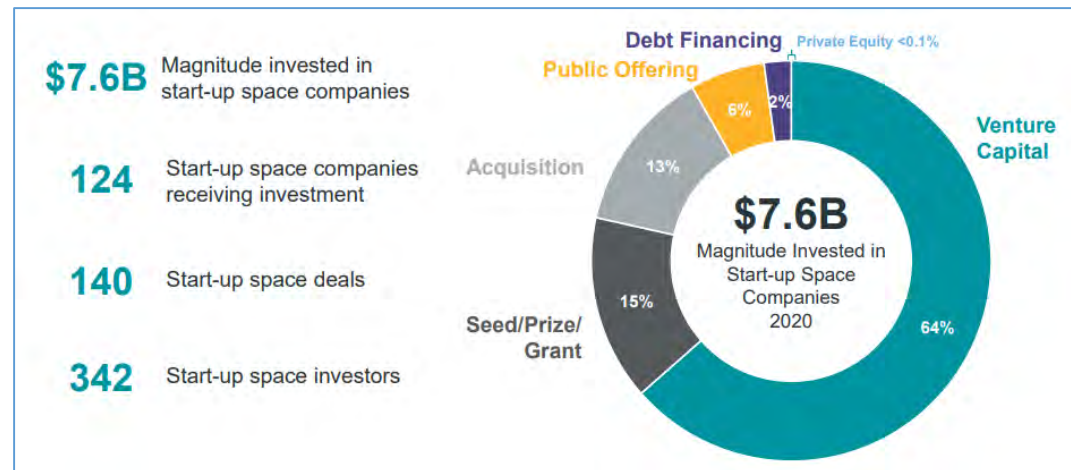
3-min video: Philippine-made cube satellite Maya-1 deployed into space

<https://www.youtube.com/watch?v=iWRprgiloE4>

Aug 14, 2018

06. Report about space start-up industry

If you follow the space start-up scene, you should download the just-released Bryce report on space start ups:



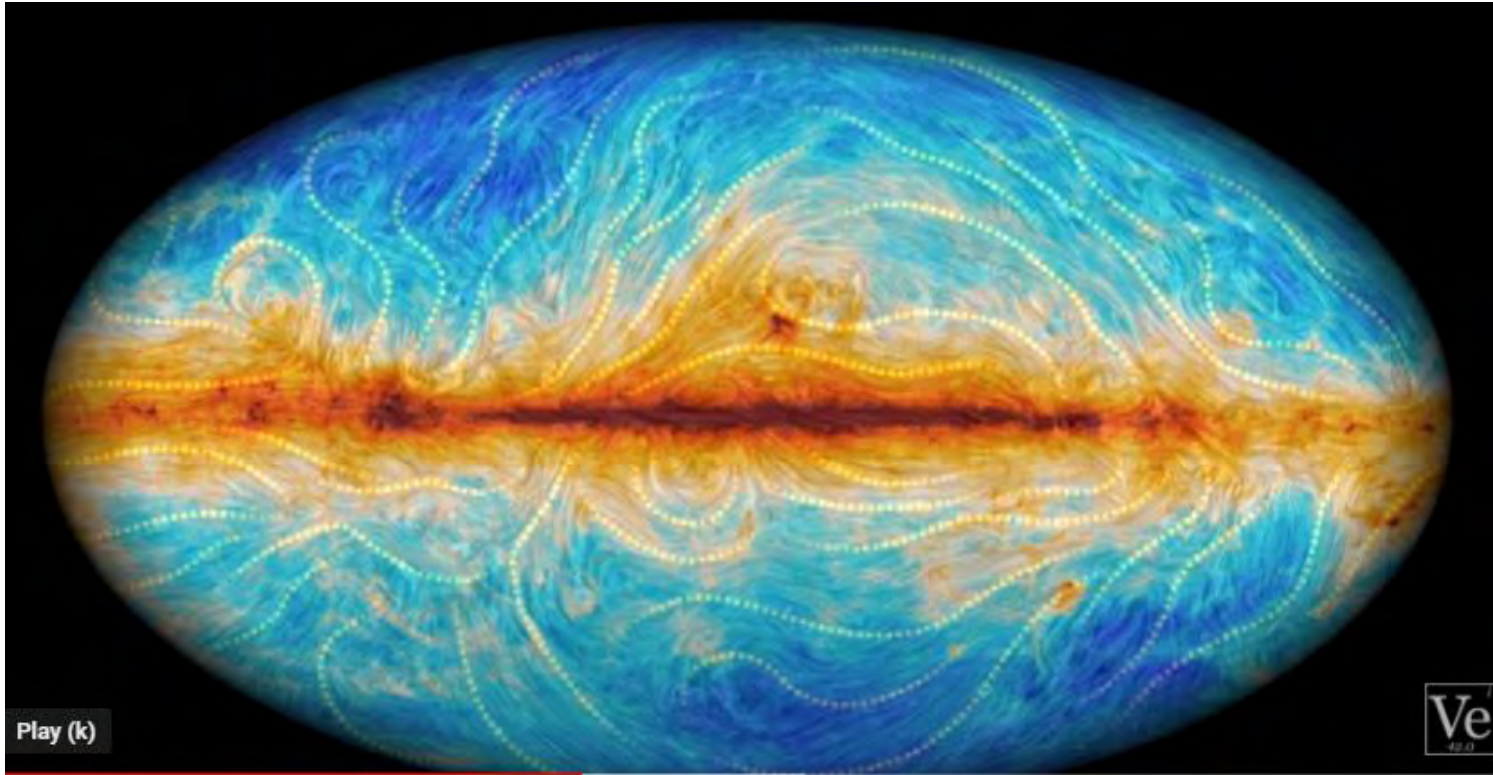
The 2021 report highlights:

- A total of 124 start-up space companies received investment.
- There are 342 investors in start-up space companies.
- A total of 140 start-up space deals were recorded.
- United States start-ups accounted for 67% (~\$5.1B) of investment in 2020. Of all companies that received investment in 2020, 38% were located within the U.S. Of the 342 investors in start-up space companies, 36% were based in the U.S.
- Nine companies accounted for 80% of the \$7.6B invested in start-up space ventures in 2020.

GET THE REPORT HERE:

https://brycotech.com/download.php?f=Bryce_Start_Up_Space_2021.pdf

07. Single Event Latch-ups; or how the universe is hostile to computers



← This video takes a general look at how cosmic rays take random pot shots at electronic circuits, and can cause “bit flips” (computational errors).

3- Single Event Effects (SEE)

Electron/hole pairs created by a single particle passing through semiconductor

- Primarily due to heavy ions and high energy protons
- Excess charge carriers cause current pulses
- Creates a variety of destructive and non-destructive damage

“Critical Charge” = the amount of charge deposited to change the state of a gate

The diagram illustrates the interaction of heavy ions and protons with a semiconductor device. A heavy ion track is shown passing through a p-type Si substrate, creating electron-hole pairs. A proton nuclear reaction is shown creating a localized ionization event. Labels include 'Heavy ion particle track', 'p-type Si', 'Metal', 'Oxide', 'Proton nuclear reactions', and 'Short-Range Recoil Produces Ionization'.

I can highly recommend this video (thanks to Tharindu for finding it):

https://www.youtube.com/watch?v=AaZ_RStOKP8

Details about the presenter of this video (the man is famous on YouTube):

https://en.wikipedia.org/wiki/Derek_Muller

08. Latest news on StarLink of SpaceX



On 23 Aug 2021, Elon Musk tweeted that over 100,000 StarLink terminals (shown above) have been shipped already.

The update on StarLink:

https://www.youtube.com/watch?v=5A_X40jEEg0

COLORADO SPRINGS — SpaceX is adding laser terminals on all future Starlink satellites and is the reason behind a break in launches for the broadband megaconstellation, president and chief operating officer Gwynne Shotwell said.

Shotwell told the Space Symposium Aug. 24 that its decision to add laser crosslinks, enabling the satellites to communicate with each other to reduce their reliance on ground stations, is “why we have been struggling” to launch a Starlink mission since June 30.

SpaceX had been conducting an aggressive launch campaign with its Falcon 9 rocket throughout the first half 2021 before the hiatus, enlarging the Starlink constellation to more than 1,600 satellites in low Earth orbit.

Typically, each Falcon 9 launch for the network has placed 60 Starlink satellites at a time. There were four Starlink launch missions this May alone.

SpaceX has regulatory permission to operate 4,408 satellites at 550-kilometers altitude for global coverage.

Shotwell said the next Starlink launch will be in “roughly three weeks.”

SpaceX launched 10 Starlink satellites with laser crosslinks to polar orbit in January, its first with the capability, so it did not need ground stations over the poles.

By enabling communications from one satellite to another on the same or adjacent orbital plane, a ground station does not have to be in the same satellite footprint as user terminals.

As well as reducing the number of ground stations needed for global coverage, laser crosslinks links can also lower latency because they reduce the number of hops between satellites and ground stations.

SPACENEWS

All future Starlink satellites will have laser crosslinks

by Jason Rainbow — August 26, 2021

Antenna pain point

The price of user terminals remains a challenge for SpaceX, which is heavily subsidizing them.

Shotwell told the conference that SpaceX continues to lose money on user terminals with every customer it acquires, because their cost is higher than the average user can afford.

“We were able to tackle almost all of the elements of the cost before we rolled out service, with the exception of the user terminal,” she said.

She said the company is on track to reduce the cost of its user terminals, which are priced to consumers at \$499, by roughly half before the end of this year.

“And then we think we’ll be able to cut that in half yet again,” she added.

However, she pointed to a global lack of semiconductors that has “delayed the new user terminals,” and a shortage of liquid oxygen that is posing other challenges for the launch side of its business.

<https://spacenews.com/all-future-starlink-satellites-will-have-laser-crosslinks/>

09. How do you sleep in space?



3-minute video:

<https://www.youtube.com/watch?v=UyFYgeE32f0>

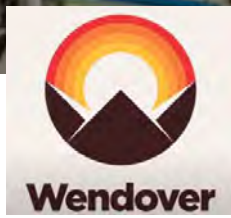
10. Logistics of the Int'l Space Station



Tasting test at the Johnson Space Center (Houston)



Checking the ice cream



The Logistics of the International Space Station

Apr 16, 2019 [12-min. video]

<https://www.youtube.com/watch?v=EkRRo5DN9II>

11. Spending the summer in Japan



– THEME FOR August

SPENDING THE SUMMER IN JAPAN

Japanese people have devised a variety of ingenious ways to get through the hot and humid summers. This month's Highlighting Japan introduces some of the traditional seasonal customs that are still practiced today along with other unique features of the Japanese summer.

**Download the August 2021 edition
of HIGHLIGHTING JAPAN using this
link:**

<https://www.gov-online.go.jp/eng/publicity/book/hlj/20210801.html>

12. Trajectory design for deep space exploration missions, Dr. N. Ozaki



MIC-7 Home Page
<http://www.spacemic.net/>

7th Mission Idea Contest (MIC7) Lecture Series for Deep Space Science and Exploration with Micro/Nano Satellites



Lecture 4, March 1st 2021
Assistant Professor Naoya OZAKI,
JAXA.

*“Trajectory Design for Deep Space
Exploration Missions”*

Circular Restricted Three-Body Problem (CRTBP)

Equations of motion for three-body problems in inertial systems

$$\frac{d^2\mathbf{r}}{dt^2} = -\frac{GM_1}{r_1^3}\mathbf{r}_1 - \frac{GM_2}{r_2^3}\mathbf{r}_2$$



This video

<https://www.youtube.com/watch?v=RxpYDXSzghk>



The 7th

Mission Idea Contest

For Deep Space Science and Exploration

Overview

Requirements

Schedule

Application

FAQ

Contact

Lecture


Lecture series for the 7th Mission Idea Contest for Deep Space Science and Exploration with micro/nano satellites

Organized by MIC Office, UNISEC-Global
Sponsored by Institute for Open Innovation, the University of Tokyo

[Registration is here.](#)



The University of Tokyo,
Institute for Open Innovation

 [Lecture list PDF](#)

See the list of all the lectures of this series

<http://www.spacemic.net/lecture.html>

13. Paraguay's participation in JAXA KIBO robot programming competition

Subject: Contribution to the Newsletter - Participation of Paraguay on JAXA KIBO Competition
From: Alejandro Román
Date: 2021/09/10
To: George Maeda
CC: JOSEGENES-GMAIL.COM

Dear Maeda-sensei,

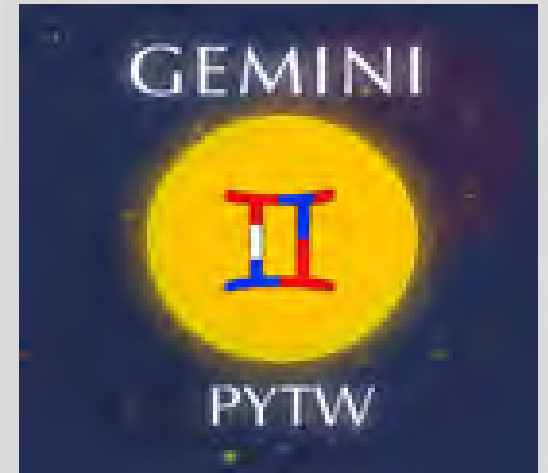
I hope this mail finds you well; please receive our best regards from Paraguay. Also, as promised, I am attaching a short description of our participation in the JAXA KIBO Robot Programming Challenge Competition with outstanding results, the competition is still ongoing, and I hope we have an excellent position on the finals that will be held with direct contact with the ISS in the next days.

Kindest regards,
Alejandro R

Alejandro J. ROMÁN MOLINAS
Prof. Mg. | IAA Academician (M4)
General Director of Aerospace Development
PARAGUAYAN SPACE AGENCY



GeminiPYTW



José Genes¹
Alejandro Román²

¹ Team Leader, Master of Science in Space Science and Engineering candidate at National Central University, Taiwan: josegenes@gmail.com

² Team Coach, General Director of Aerospace Development, Paraguayan Space Agency, Paraguay: aroman@aep.gov.py

GeminiPYTW

- KIBO Robot Programming Challenge is a hackathon organized by JAXA.
- The participating are supposed to let Astrobee, a robot inside the ISS, move among checkpoints and perform certain actions, such as read a QR code, point lasers at bullseyes and take pictures in order to help astronauts to solve problems that could compromise the astronauts' lives.

Game Story

[The ISS air leak that occurred in 2020](#)

has been repaired by talented programmers in Asia.
Everyday back on the ISS ...

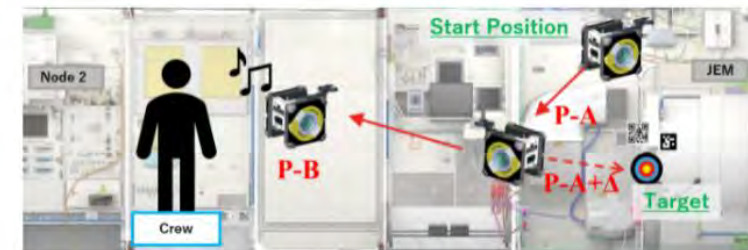
Because only an emergency measure was taken, the air leak recurred in 2021.

The location of the leak has already been identified.
Asian programmers,
do a complete repair and report completion of the mission to the astronauts!

※ This is a fictional story.

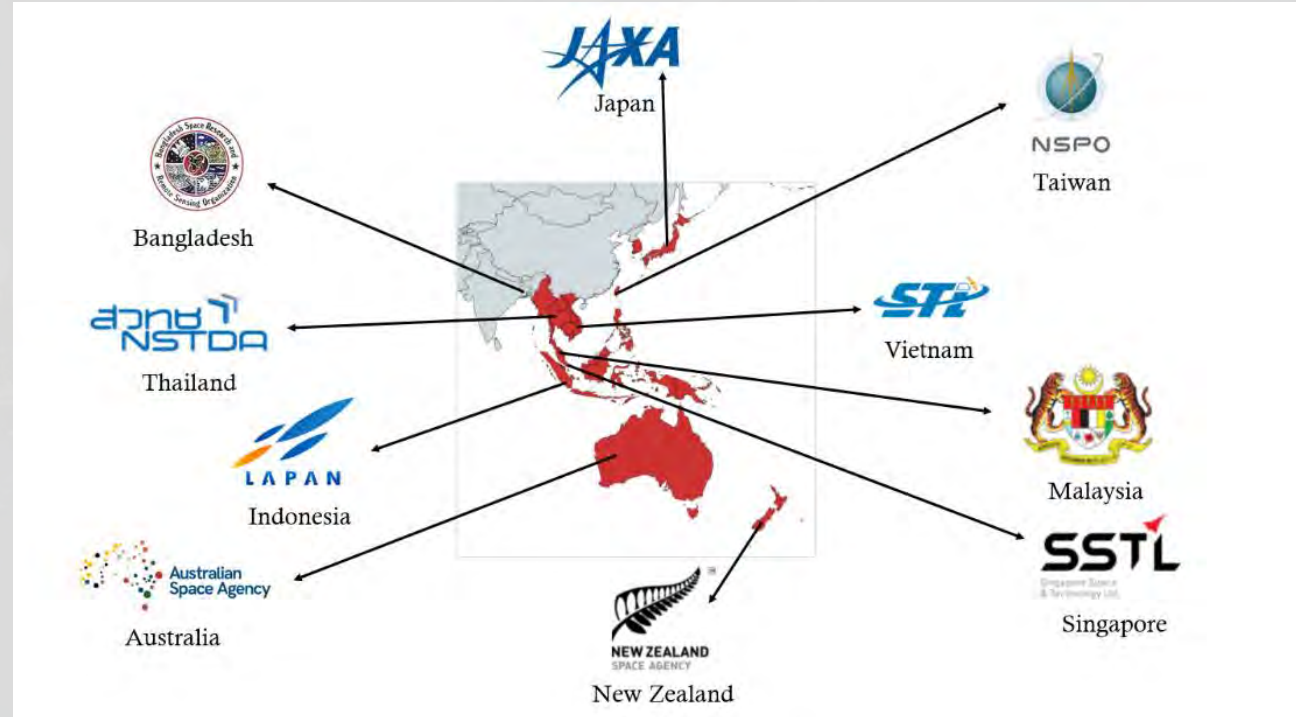
Game Rules

- 1 Move Astrobee and read the AR tags and the QR code
- 2 Analyze the position/orientation of the target from information obtained from the QR code.
- 3 Adjust Astrobee's position/orientation and illuminate the center of the target with Astrobee's laser.
- 4 Finally, report completion of the mission to a crew member. Your score is calculated from the accuracy of laser pointing and the elapsed time.



GeminiPYTW

- KIBO Robot Programming Challenge has two rounds: a national one and an international one.
- This competition is restricted to countries within Asia-Pacific region.





GeminiPYTW

- Within the 2nd KIBO Robot Programming Challenge, Gemini PYTW is representing Taiwan in the international round.
- The team is composed by students from the Taiwan Paraguay Polytechnical University (UPTP) as from members from the Paraguayan Space Agency (AEP) as well.

2nd KIBO Robot Challenge

Team Members

 Gilberto Penayo	 José Genes Team Leader	 William Eckerleben
 Sebastián Samudio	 Pamela Aguirre	 Alejandro Molinas

Team Support

 Cad AvP Matías Ovando	 Rubén Alvarenga
---------------------------	---------------------

Team Coaches

 Mg. Alejandro Román	 Mg. Ana Ayala
-------------------------	-------------------

GEMINI
PYTW

AGENCIA ESPACIAL DEL PARAGUAY
UNIVERSIDAD POLITÉCNICA TAIWAN - PARAGUAY
臺灣-巴拉圭科技大學



GeminiPYTW

- The Taiwanese Preliminary Round was done on July 10th, where we have won in almost all categories, having competed against 11 very good teams.
- This resounding victory was highlighted by the Paraguayan press.



GeminiPYTW

- On July 18th, JAXA held the Programming Skills competition, where our software was challenged with different values from the Preliminary Round. There, we have won the second place!
- The final round will take place on September 15th, in real time, at the ISS. We are very hopeful that we will win!



— Ranking —

Tier In the Final Round	Rank	Team	Class	Score
	1st	Indentation Error (Thailand)	A	88.22 pt
1st Tier	2nd	GeminiPYTW (Taiwan)	A	71.77 pt
	3rd	Enigma Systems (Bangladesh)	A	59.28 pt
	4th	Cepheus-2 (Indonesia)	A	56.16 pt
	5th	Cosmic Jellyfish (Japan)	A	26.17 pt
2nd Tier	6th	Descendants of the Sun (Singapore)	A	21.00 pt
	7th	Dream Rover (Australia)	A	09.64 pt
3rd Tier	8th	LEMON TREE (Malaysia)	C	58.6 sec
	9th	ELON'S FANGIRLS (New Zealand)	C	3min 40.1

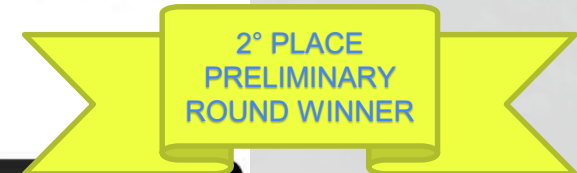
Radio Nacional AM
@rmpy920am

Entrevista #ParaguayPuede
#Nacionales

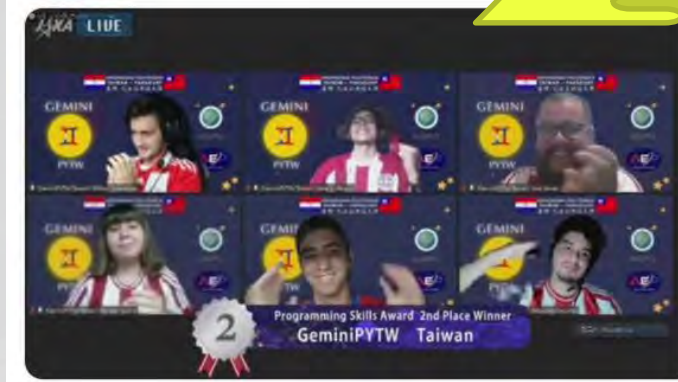
Ing. José Genes, líder del equipo @AEP_News y @PolitecnicaUptp

Paraguay se destaca en el concurso KIBO-RPC-ISS, organizada por Agencia de Exploración Espacial de Japón

En Vivo por la #920am
bit.ly/2T080qp
Translate Tweet



END OF THIS SECTION



14. YouTube channel: UNISECmovie



<https://www.youtube.com/watch?v=GPPrYHD2vUU&t=1431s>



<https://www.youtube.com/watch?v=xVC6noFxl4>



<https://www.youtube.com/watch?v=3fEb6msuxes>

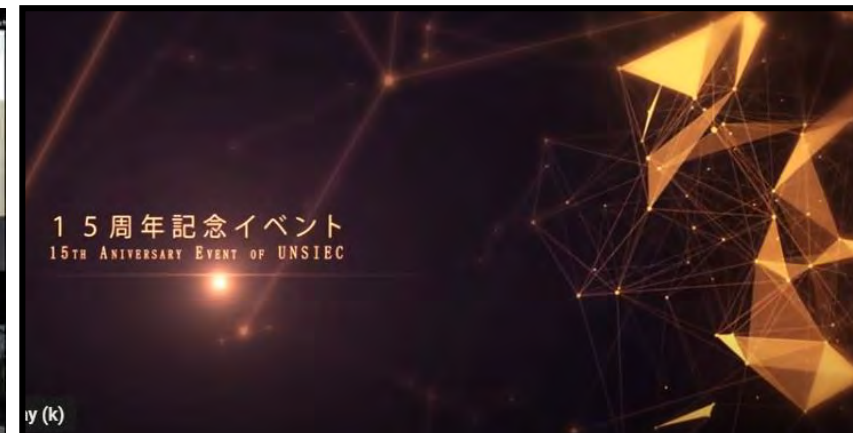


<https://www.youtube.com/watch?v=J66H9cJDpK>

This is a UNISEC official channel. We have released wide range of pace engineering projects organized and supported by UNISEC.



<https://www.youtube.com/watch?v=TwTYxmDYLTl&t=505s>



<https://www.youtube.com/watch?v=a71-JDqb9LQ>

**【UNISEC15周年記念イベント】
ダイジェストNEWS**

Link to the channel: https://www.youtube.com/results?search_query=uniseccmovie

15. Self-introduction by incoming SEIC student: John Paul Almonte (“JP”)



SEIC warmly welcomes a new student in October: **John Paul Almonte (“JP”)** of the Philippines. He has written his self-introduction -- see the next few pages.



The screenshot shows the JICA website interface. At the top left is the JICA logo and the text "Japan International Cooperation Agency". To the right are language options (日本語, English, Français, Español), utility links (Site Map, FAQ, Contact Us), and a search bar. Below the header is a navigation menu with items: Home, About JICA, News & Features, Countries & Regions (highlighted), Our Work, Publications, and Investor Relations. The main content area shows a breadcrumb trail: Home > Countries & Regions > Asia > Philippines > Press Release > JICA, Philippines boost cooperation in space technology via scholarships in Japan. A "Countries & Regions" sidebar lists "Asia" (selected), "Southeast Asia", "Cambodia", and "Indonesia". The main heading is "Press Release" with a date of "August 18, 2021". The title of the press release is "JICA, Philippines boost cooperation in space technology via scholarships in Japan". The introductory text reads: "As the Philippines moves to strengthen its space technology development, the Japan International Cooperation Agency (JICA) announced its support to help build the country's human resource capability in the space technology field."

JP has secured a scholarship from JICA under the "Knowledge Co-Creation Program" (KCCP), which in turn is part of "Human Resource Development" (HRD) for Space Technology Utilization. These new programs aim to help engineers in emerging economies to study space technology with Japan's leading universities, Japan Aerospace Exploration Agency (JAXA), and JICA. *See the website at the left for more details about JP's JICA scholarship.*

GO TO THE SOURCE: <https://www.jica.go.jp/philippine/english/office/topics/news/210818.html>



John Paul Almonte

“JP”

Graduated BS Electronics and Communications Engineering from the University of the Philippines Diliman in 2018

Background in embedded systems, RF engineering, and satellite communications

Researcher at the STAMINA4Space program from Sept 2018 - 2021

Research interests include satellite development, satellite IoT, and artificial intelligence applications in space technology

UNDERGRADUATE ELECTIVE AND RESEARCH

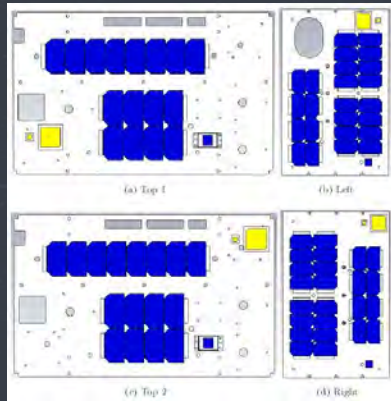
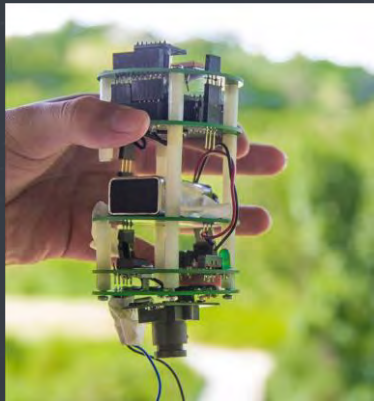


Photo (left) of our Undergraduate CanSat Development; Screenshot (right) from our S-band and X-band Antennas for Diwata-1 Bus Chassis Undergraduate Project

RESEARCHER AT THE STAMINA4SPACE PROGRAM



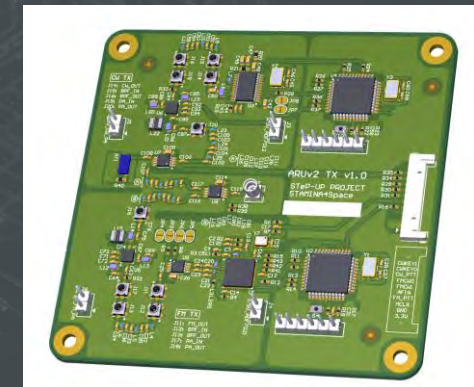
Screenshot of CNN news coverage during the announcement of Diwata-2's Amateur Radio Unit



Photo taken during my lecture on amateur radio satellites and ground station operations at IIT



Photo taken inside the laboratory's clean booth while testing a COTS power amplifier



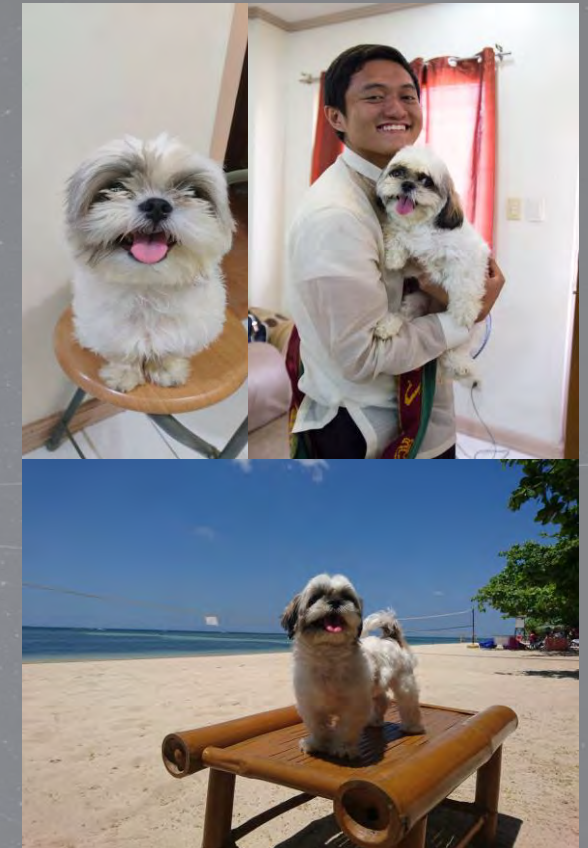
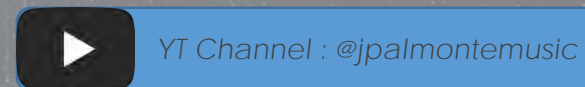
Screenshot of my FMCW transmitter for a 1U amateur radio unit payload

I come from the Bicol region in the “Sili”
Capital of the Philippines, Legazpi City, Albay.

More information about my hometown in the next slide



I play three instruments and
have performed in live gigs and
musical ensembles



I'm a proud fur-parent of
my dog, Nicky.

Albay is famous for its magnificent Mayon Volcano, known for its near perfect cone shape



Pinangat or Laing is a vegetable dish using taro leaves and coconut milk



Pili nut can be found in the Bicol region. It can be eaten raw, roasted, or caramelized



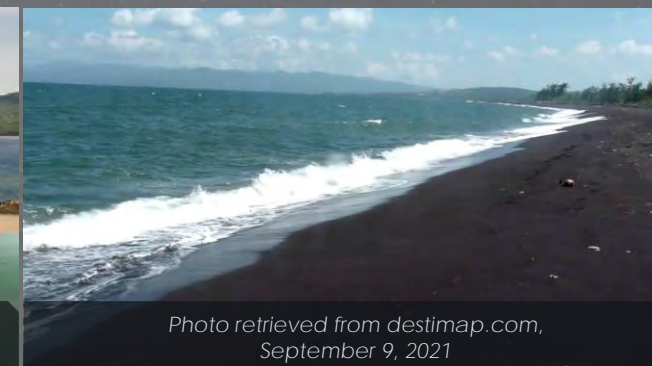
Sili ice cream is a staple for tourists who want a different taste of ice cream



Cagsawa Ruins is the remains of the 16th century Cagsawa church that was destroyed in the 1814 eruption of Mt. Mayon



Tourists can choose between white and black sand beaches of Albay



In my spare time, I play MMORPGs,
watch anime, and read manga



Images (left) Genshin Impact logo retrieved from genshin.mihoyo.com; (right) Straw Hat Pirates Jolly Roger from One Piece retrieved from hero.fandom.com,
September 9, 2021



I also play sports such as lawn
tennis, frisbee, and rock climbing

I enjoy travelling and landscape photography. I like spending time just wandering
around by myself or with friends



END OF THIS SELF-INTRO

16. A YouTube channel that aspires to explain Kyoto and Japanese culture to you



If you recently arrived in Japan for travel, study, or work, I can recommend this prolific YouTuber ("Shogo"). He is cranking out videos that provide good insights into Japan. The link below takes you to his self-intro. Because of the pandemic he had a terribly tough ordeal. However, you can find out how he overcame the dark months of the pandemic. Quite a dramatic story. G. Maeda.



HERE IS THE SELF INTRODUCTION BY THIS YOUTUBER: <https://www.youtube.com/watch?v=0YOXDPBTwC4>

17. BIRDS-2 alumnus joins a start-up in Malaysia



Dr. Syazana Basyirah Binti Mohammad Zaki (BIRDS-2 project, Malaysia) has joined this space start-up firm in Malaysia with this position:

/Head

/Mission Administration, Policy and Compliance

/AngkasaX Innovation Sdn Bhd

/Georgetown, Penang, Malaysia

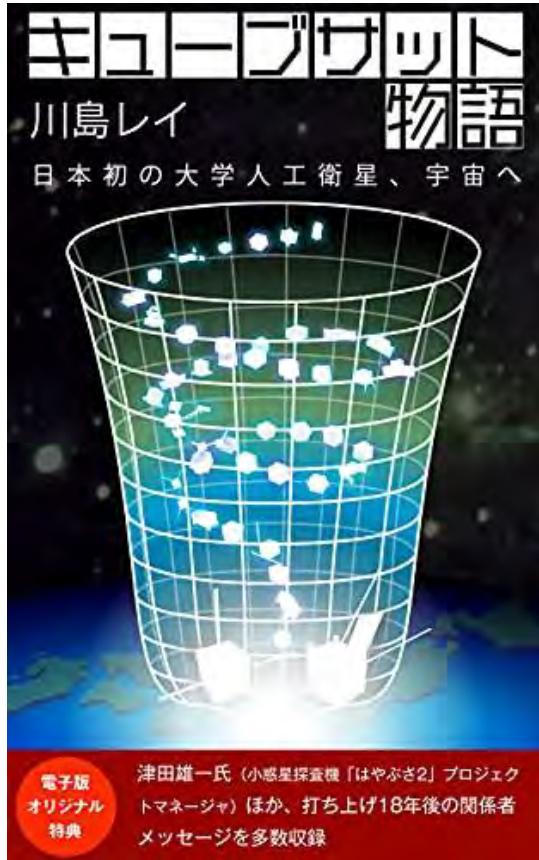
Info access points are:

<http://www.angkasax-innovation.com/>

<https://www.facebook.com/AngkasaX.Group>



18. Prof. Tsuda (Project Manager of Hayabusa-2) comments on 「キューブサット物語」

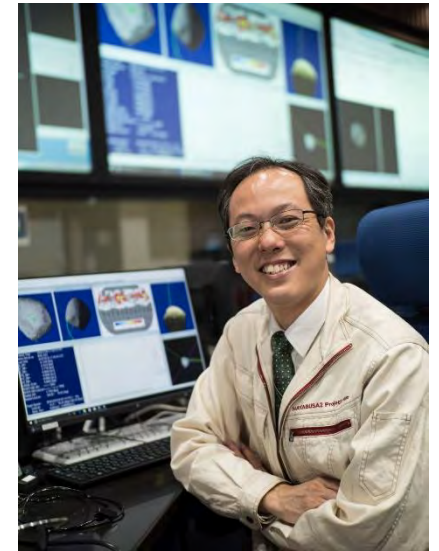


「キューブサット物語 18年後のメッセージ収録」Kindle版

はやぶさ2の津田雄一さんがFaceBookでご紹介くださいました。津田先生は、本書で東大のキューブサットXI-IV(サイ・フォー)のプロマネとして登場しておられます。

====

川島レイさんの「キューブサット物語」リバイバル版が発刊されました！ 20年前、世界初の10cmサイズの小さな人工衛星づくりに懸けた若者たち(僕を含みます...)のドキュメンタリーです。丹念な取材に基づく事実を並べて、こんなに面白い文章になるのは川島さんならではの。僕自身、技術者として迷った時に原点に立ち戻れるバイブルのような本です。今回のリバイバル版は、登場人物の20年後のメッセージが収録されています。人の20年の成長例としても面白い！



津田先生
JAXA/ISAS

Available from Amazon:

www.amazon.co.jp/%E3%82%AD%E3%83%A5%E3%83%BC%E3%83%96%E3%82%B5%E3%83%83%E3%83%88%E7%89%A9%E8%AA%9E-18%E5%B9%B4%E5%BE%8C%E3%81%AE%E3%83%A1%E3%83%83%E3%82%BB%E3%83%BC%E3%82%B8%E5%8F%8E%E9%8C%B2-%E5%B7%9D%E5%B3%B6%E3%83%AC%E3%82%A4-ebook/dp/B09B4ZDHWV

This is another report from Lily Asongfac of Cameroon.



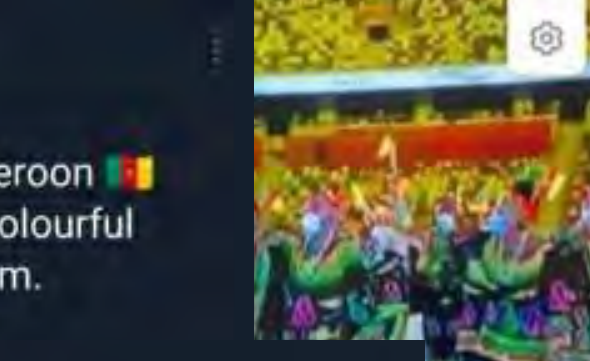
Her first report appeared on pages 5-9 of BPN #66.

Cameroon's attire at the Olympics Opening Ceremony



You might have come across a post on social media applauding the cultural attire worn by the Cameroonian athletes at the Opening Ceremony of the Olympics, Tokyo 2020, or not.

Well I'm here to tell you more about "Toghu" which is so loved by Cameroonians and people from all around the world.



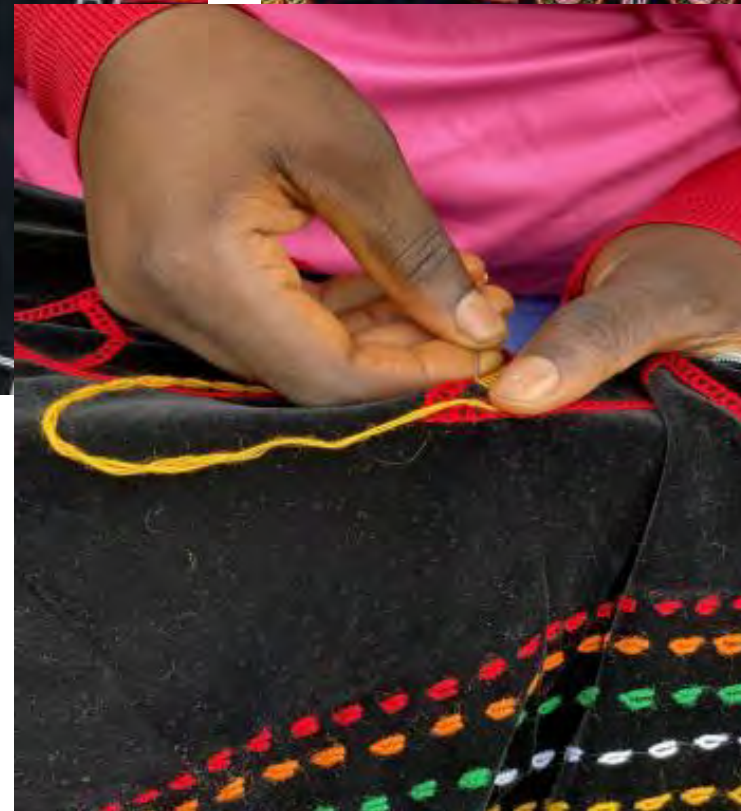
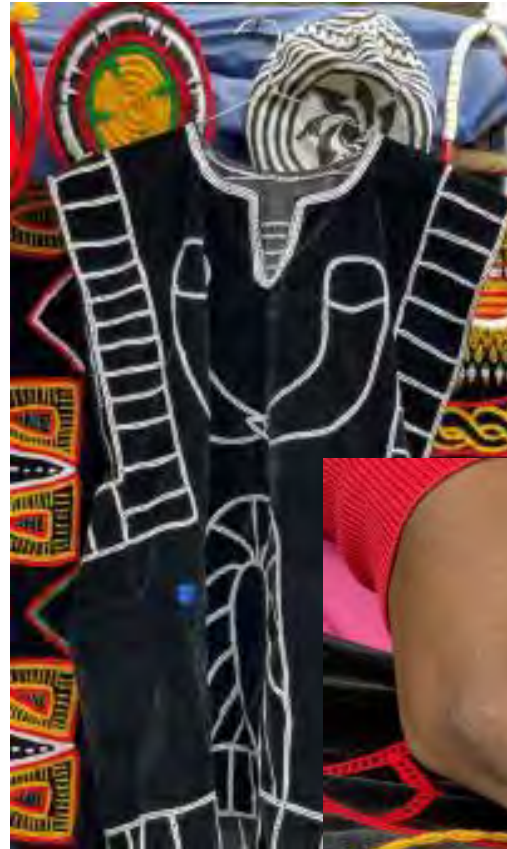


The **Toghu print** or Atoghu fabric is one of Cameroon's most popular print. This is because of the beautiful texture of the fabric and it's rich feel on the skin. The Toghu has gained attention outside Cameroon with the help of social media. Comparatively, with other traditional Cameroon prints and fabrics, the Toghu is much loved across Cameroon. Atoghu or Toghu depending on where you are from in Cameroon is mostly worn by royalty in the North West Province and Western Province of Cameroon.

Today, this regalia has been modernized by using different types of colored thread and calico materials for a more contemporary taste.

The fabric is usually handmade and also tailored. This is called marking. Designed with several colors, red, orange, green, white, yellow. To create a beautiful pattern. Designs are numerous and prices differ according to its marking.

Hope you learned something about Cameroon



Meet Charles Nzeussi

Charles-Aime Nzeussi Mbouendeu



Charles-Aimé Nzeussi Mbouendeu

Charles is currently the National Point of Contact and has hosted the position of African Space Generation Workshop Deputy Manager for the Space Generation Advisory Council (SGAC). His good work qualified him to be nominated as one of the International Astronautical Federation (IAF) Launchpad mentorship programme winners.

Through SGAC Space Technologies for Earth Applications Working Group, He co-authored some papers amongst which is one titled “Current and Near-Future State of Space Technology for Disaster Situations”; and he is also the project secretary of the project title “Realtime Flood Risk Assessment in developing countries using Social media, Optical and SAR satellite data” funded by UNESCO. He’s one of the members of the steering committee for the International Astronomical Contest. He is also a volunteer of the International Association for the Advancement of Space Safety where he manages social. Charles is contributing to the International Project/Programme Management Committee (IPMC) Young Professionals Workshop for the International Astronautical Federation. We are currently working on Management of remote collaboration in the space industry.

Support Charles Nzeussi's Space Education Dream

Charles' dream is to be a space professional and to use space tools to advance his country and continent. Most importantly, he would like to give more opportunities to other youths coming after him in the field.

He believes the main way for him to reach that goal is to attend the International Space University.

Charles is a young man from Cameroon where there are not many opportunities for such unique education.

Read more & donate here <https://gofund.me/695ab950>

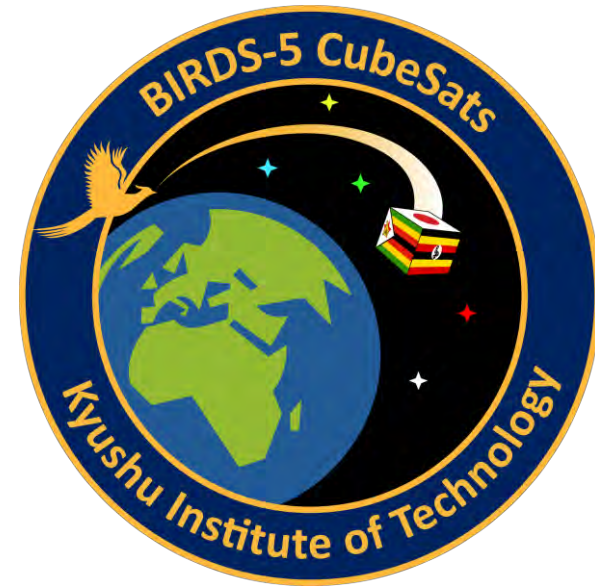
Please feel free to forward this message to your contacts to help this campaign reach its goal!

Thank you very much!



End of report from Cameroon

20. Software Defined Radio (SDR) for Space Applications



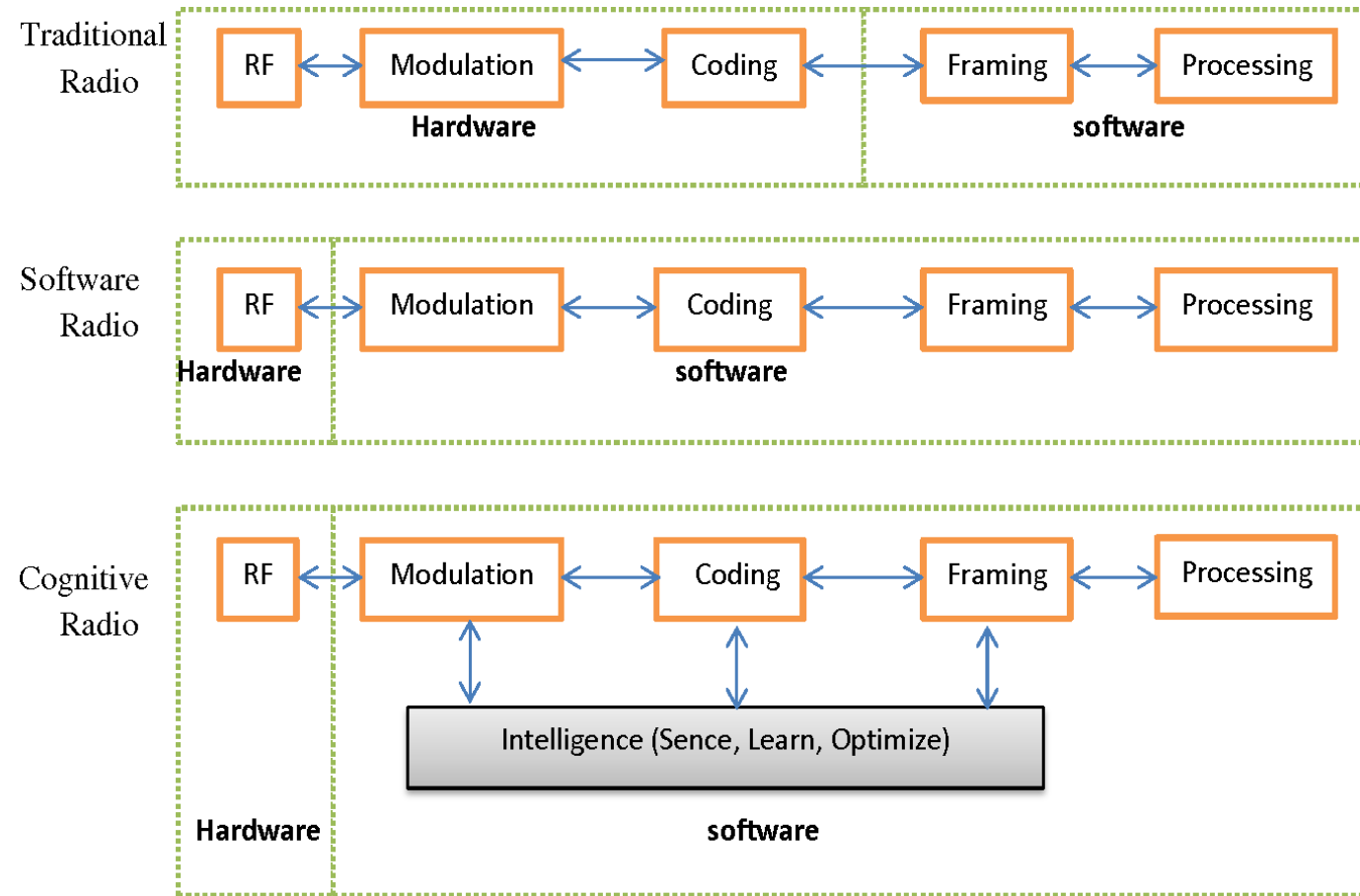
**By : Ramson Nyamukondiwa
(BIRDS-5, Zimbabwe)**

Date: 14/09/2021

Email: munyaradzi.nyamukondiwa-ramson769@mail.kyutech.ac.jp

BACKGROUND OF Software Defined Radio (SDR)

- **Traditionally, radio** dedicated circuits were used to perform the task of :
 - ❑ Processing the signals to and from the **radio**
 - ❑ Signal filtering, frequency mixing, radio wave detection, signal amplification, modulation/demodulation, and others were done with dedicated circuits.
- **Software-Defined Radio (SDR)**
 - ❑ Radio in which some or all of the **physical layer functions** such as modulation and demodulation, frequency mixing etc.. are software defined
- **Physical Layer**
 - ❑ It is the lowest layer of the ISO 7-layer model as adapted for wireless transmission and reception
 - ❑ The layer within the wireless protocol in which processing of RF, IF, or baseband signals including channel coding occurs.
- With SDR everything in the digital domain is performed in software while everything in the analogue domain remains hardware



<https://www.analog.com/media/en/training-seminars/design-handbooks/Software-Defined-Radio-for-Engineers-2018/SDR4Engineers.pdf>

EVOLUTION OF RADIO

1. Hardware driven radios:

- Transmit frequencies, modulation type and other radio frequency (RF) parameters *are determined by hardware* and *cannot be changed* without hardware changes.



2. Digital radios:

- A digital radio performs part of the signal processing or transmission digitally, but is *not programmable* in the field.



3. Software Defined Radios and Cognitive Radio

- Functions, modes and applications can be *configured and reconfigured* by software.
- These are able to sense their environment and can adapt accordingly to perform operations.

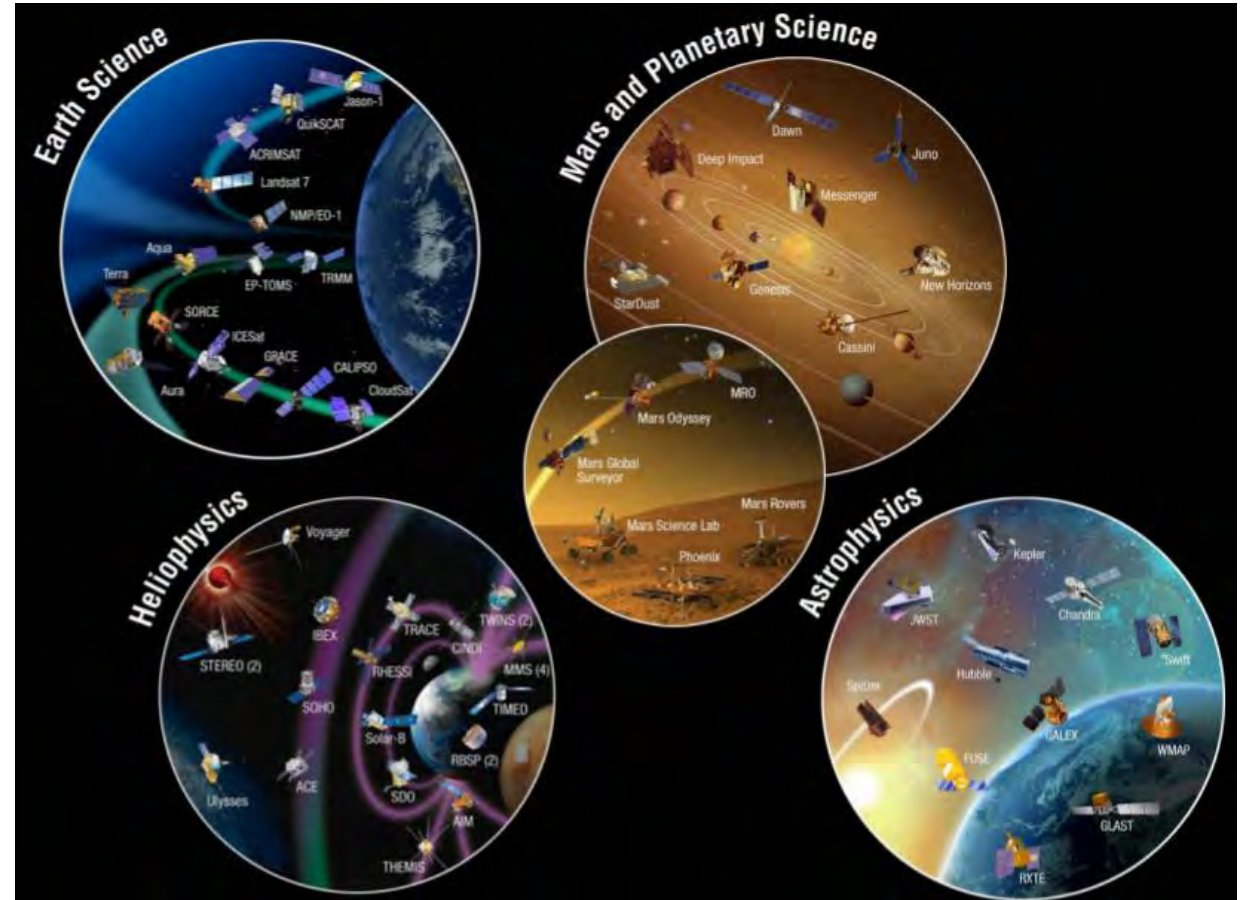


<https://www.slideshare.net/Funk98/when-might-cognitive-radio-become-economically-and-technically-feasible>

Drivers for Space Software Defined Radio

SDRs has the following advantages for space applications:

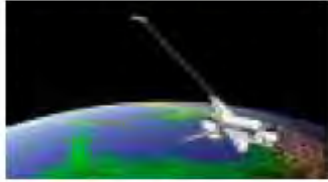
- Post-launch re-programmability to support:
 - Control, configuration, re-configurability and new application installation.
- Flexibility to support multiple signals from multiple satellites.
- Scalability, extendibility, and modular design to support evolution over time.
- Ability to allow latest application/waveform development to support new features and services without hardware upgrades.
- Affordability to promote commercially available computer software and hardware products and standards.
- Architecture overhead balanced against spacecraft constraints such as spacecraft size, weight, and power limitations
- Data rates range from kbps to Gbps and frequencies from MHz to GHz



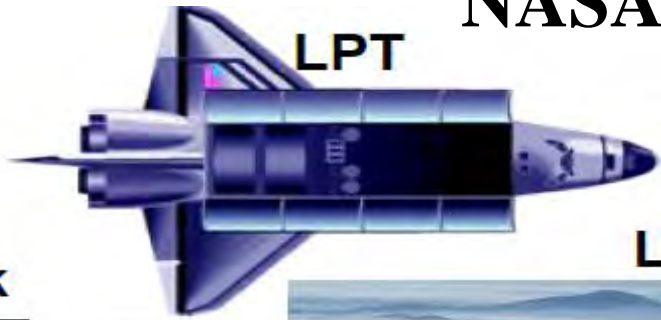
<https://ntrs.nasa.gov/api/citations/20090004687/downloads/20090004687.pdf>

NASA SDR Technology in Flight

Blackjack



SRTM

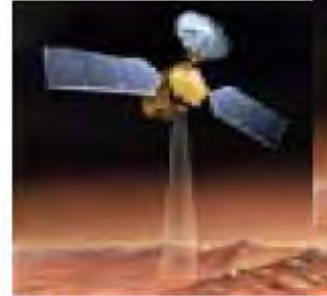


STS-107



LPT

Electra



Mars Reconnaissance Orbiter

Electra



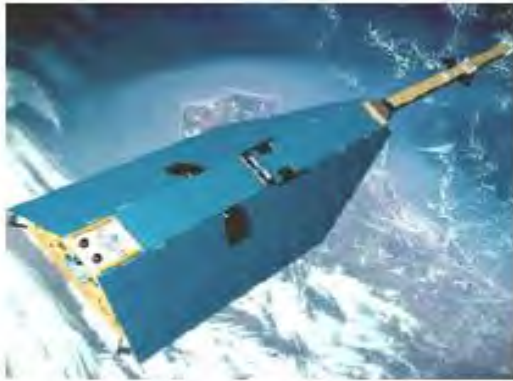
Mars Science Lab

STRS-based SDR Experiment



Comm, Nav, and Networking reConfigurable Test bed

Blackjack



Champ

LPT



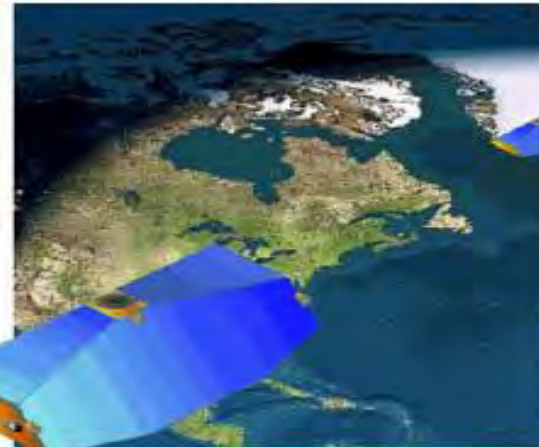
F-16 AFSS

Blackjack



JASON

Blackjack



GRACE

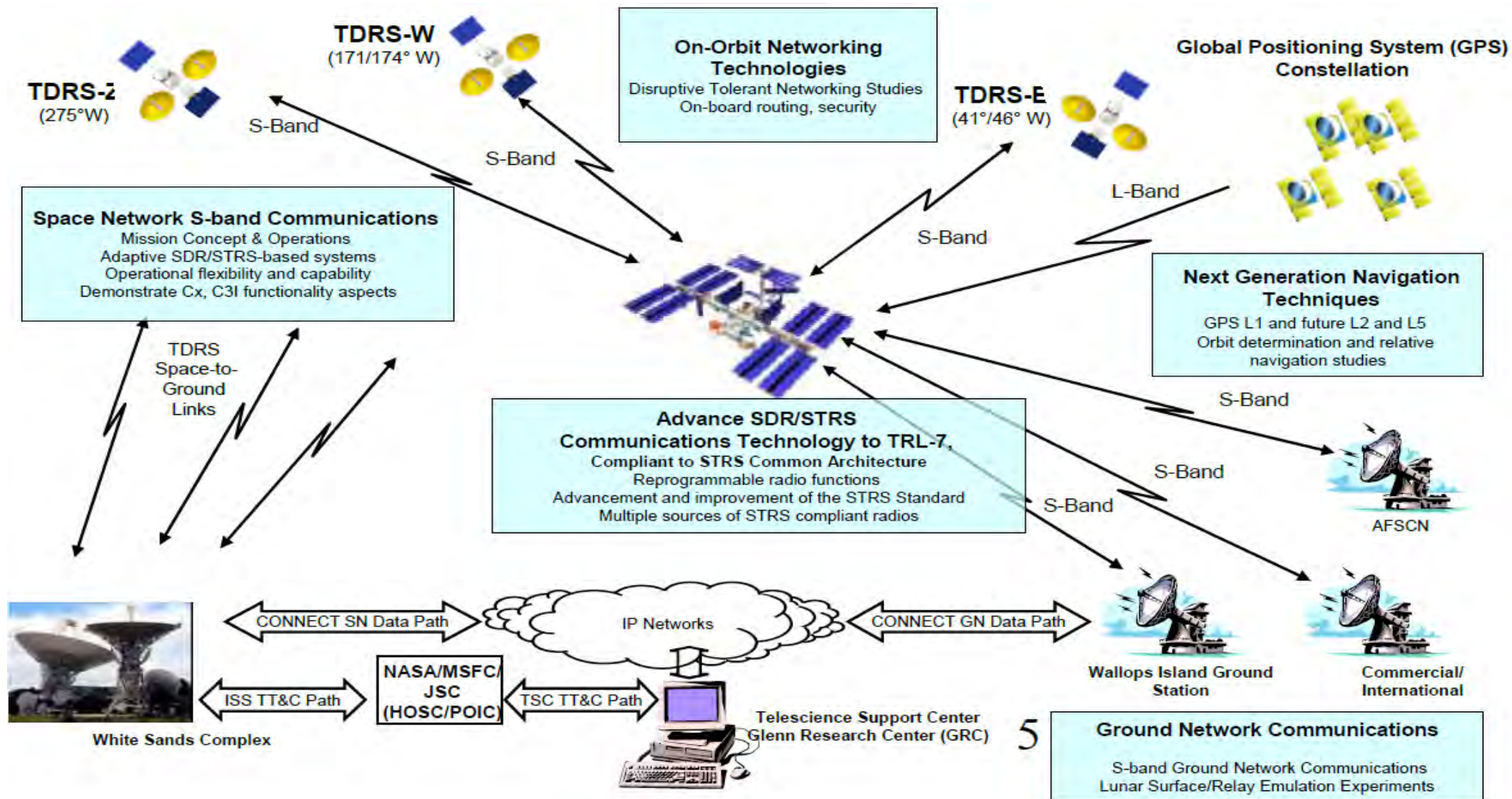
LPT



AFRL TacSat-2

SDR/STRS Flight Experiment and the Role of SDR-Based Communication and Navigation Systems: Richard C. Reinhart & Sandra K. Johnson Communications Division NASA's John H. Glenn Research Center Cleveland, Ohio IDGA 6th Annual Software Radio Summit February 25 - 28, 2008

Examples of SDR Space Applications



SDR/STRS Flight Experiment and the Role of SDR-Based Communication and Navigation Systems: Richard C. Reinhart & Sandra K. Johnson Communications Division NASA's John H. Glenn Research Center Cleveland, Ohio IDGA 6th Annual Software Radio Summit February 25 - 28, 2008

Waveform Parameters Supported by SDR

Waveform Parameter	Specifications
Supported Modulations	<ul style="list-style-type: none"> • BPSK, QPSK, 8-PSK, 16,32,64 QAM • User defined linear constellations with up to 64 points (6 bits/symbol) • T/2 offset version of each modulation (e.g., OQPSK) • Non-coherent detection of differentially encoded linear modulations: DBPSK, DQPSK, pi/4-DQPSK, D8PSK, pi/8-D8PSK • Continuous phase modulations including GMSK, FSK
Spreading Modes	<ul style="list-style-type: none"> • Unspread or Direct sequence spread
Spreading Codes	<ul style="list-style-type: none"> • Maximum length, gold sequence, GPS C/A
Symbol (Chip) Rates	<ul style="list-style-type: none"> • 100 symbol/sec -10 Msymbols/sec
Spreading Factor/PG	<ul style="list-style-type: none"> • Spreading factors (SF) $SF=\{1,16-2^{14}\}$ • Processing Gain (PG) $=\{0-42\}$ dB
Data Rates	<ul style="list-style-type: none"> • Data rate is a product of: spreading factor, symbol (chip) rate, modulation and coding
Pulse Shaping	<ul style="list-style-type: none"> • Unshaped (rectangular pulse; beta=0) • Programmable shaping filter (e.g. RRC)
Forward Error Correction	<ul style="list-style-type: none"> • Reed Solomon (regular or CCSDS) with symbol inter-leaver depths of 2 to 8 • Convolutional (r=1/2, 1/3) for constraint lengths of 7 and 9 • Turbo product code (up to 128x128) • Turbo 3GPP2 • LDPC (DVB-S2, ITL 8/0)

Micro-Electric Platforms for SDR

- Software-defined radios have been employed on numerous platforms, including general purpose microprocessors (GPP), digital signal processors (DSP), and graphics processing units (GPU)

Feature	GPP	DSP	GPU	FPGA
DSP Operations	Moderate	Good	Good	Good
General Operations	Good	Poor	Poor	Poor
Flexibility	High	Low	Moderate	High
Size	Moderate	Small	large	Large
Power Efficiency	Moderate	Good	Poor	Large
Common Brands	Intel, AMD	Texas Instruments	nVidia, AMD	Xilinx, Altera
Programming Language	C, Java	C, Python, Assembly	CUDA, C	Verilog, VHDL

Evaluation of SDRs Suitable for Space Applications

Parameters	LimeSDR mini	USRP200/210	MatchStiq Z3U	HackRF One	USRP™ B200mini
Frequency Range	10 MHz-3500 MHz	70MHz-6000 MHz	70MHz-6000MHz	1MHz-6GHz	70 MHz to 6 GHz
RF Bandwidth	30 MHz	56 MHz	56 MHz	20MHz	56 MHz
Sample Depth	12 Bit	12 bits	12 bits	8 bits	12 bits
Sample Rate	20MSPS	61.44MSPS	61.44MSPS	20MSPS	61.44MSPS
Transmitter Channels	1	1	1	1	1
Receivers	1	1	1	1	1
Duplex	Full	Full	Full	Half	Full
Interface	USB 2.0	USB 3.0	USB 3.0	USB 2.0	USB 3.0
Programmable Logic Gates	64 macrocell CPLD	75k		64 macrocell CPLD	100k
Chipset	MAX5864, MAX2837, RFFC5072	AD9364	AD9361	MAX5864, MAX2837, RFFC5072	AD9364 RFIC
Open Source	Full	Schematic, Firmware	Schematic, Firmware	Full	Schematic, Firmware
Oscillator Precision	+/-20ppm	+/-2ppm	+/-1ppm	+/-20ppm	+/-2ppm
Transmit Power	-10dBm+ (15dBm @ 2.4GHz)	10dBm+	6dBm+	-10dBm+ (15dBm @ 2.4GHz)	10 dBm+
Price	\$160	\$970--1000	\$4500	\$299	\$1900-2000
Dimensions	69 mm x 31.4 mm	9.7x15.5x1.5 cm	3.64" x 2.74" x 0.75"	124mm x 80mm x 18mm	83.3x50.8x8.4 mm
Weight	20g	350g	158.75g	227g	24 g
Noise Figure		<8 dB	< 8 dB	11.1 dB	< 8 dB
Temperature	-40-85 °C	-40-75 °C	-40°C to +85°C	-40°C to +85°C	-40-75 °C

Recommended Choices are highlighted

My research on space SDRs

My research is based on SDRs for Space Applications

Measuring SDR Sensitivity

PC: GNU Radio

Inside the Shield Box

Signal Generator

USB to USB

Components

- Hack RF SDR
- 40dB Atten.
- USB cable
- RF cables

Test Plan : Measuring TRX Sensitivity

- Measure cable loss
- Measure received and transmitted signal power at the antenna
- Calibration
- Uplink success rate

Cable loss: 1.89dB

QT GUI Frequency Sink

Average Noise Floor -120dBm

Hardware Implementation in Software using GNU

Progress in Pictures

My Work Setup

PC

GNU Radio

SDR (TX)

LC

Receiving mode

Night Studies

Configurations of SDR in Linux

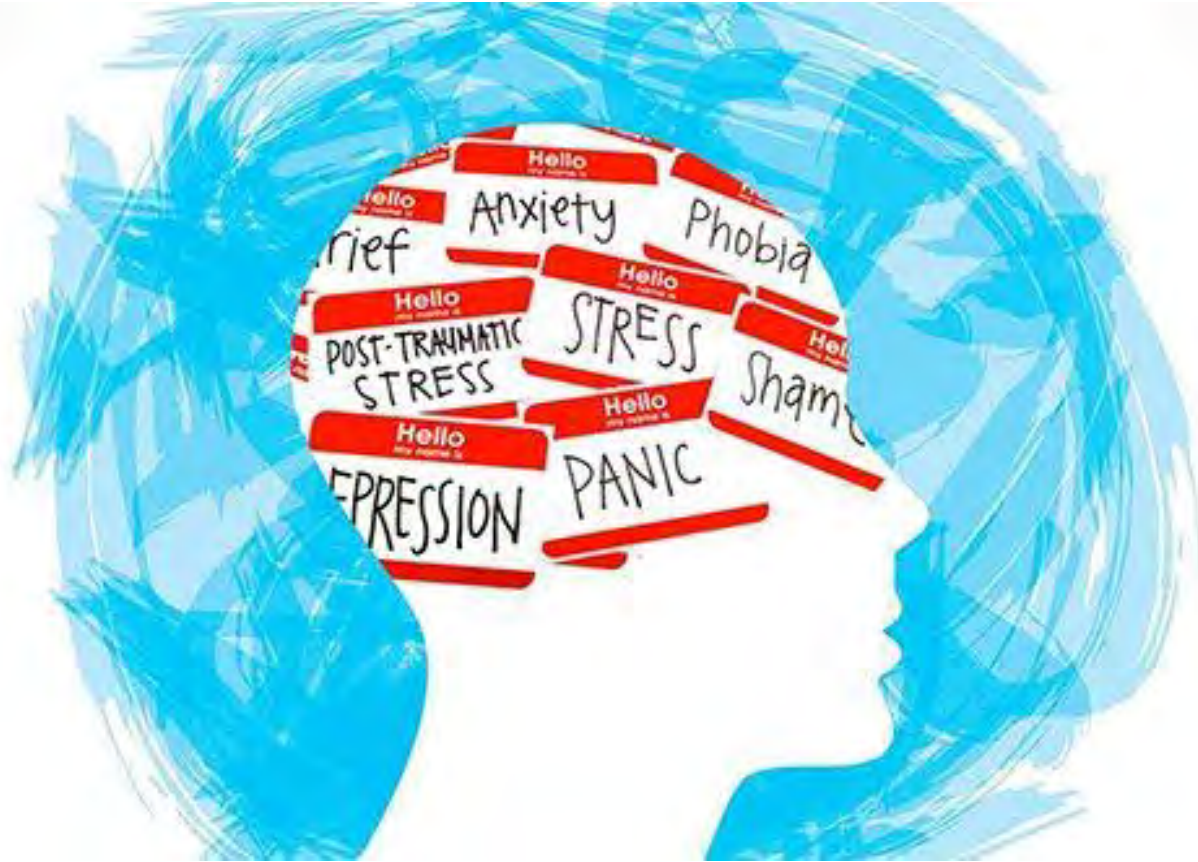


THANK YOU

ありがとうございます。

Arigatou gozaimasu.

21. Report from Bhutan



Source: The Bhutanese

Mental Health in Bhutan

by:

Ms. Pema Zangmo

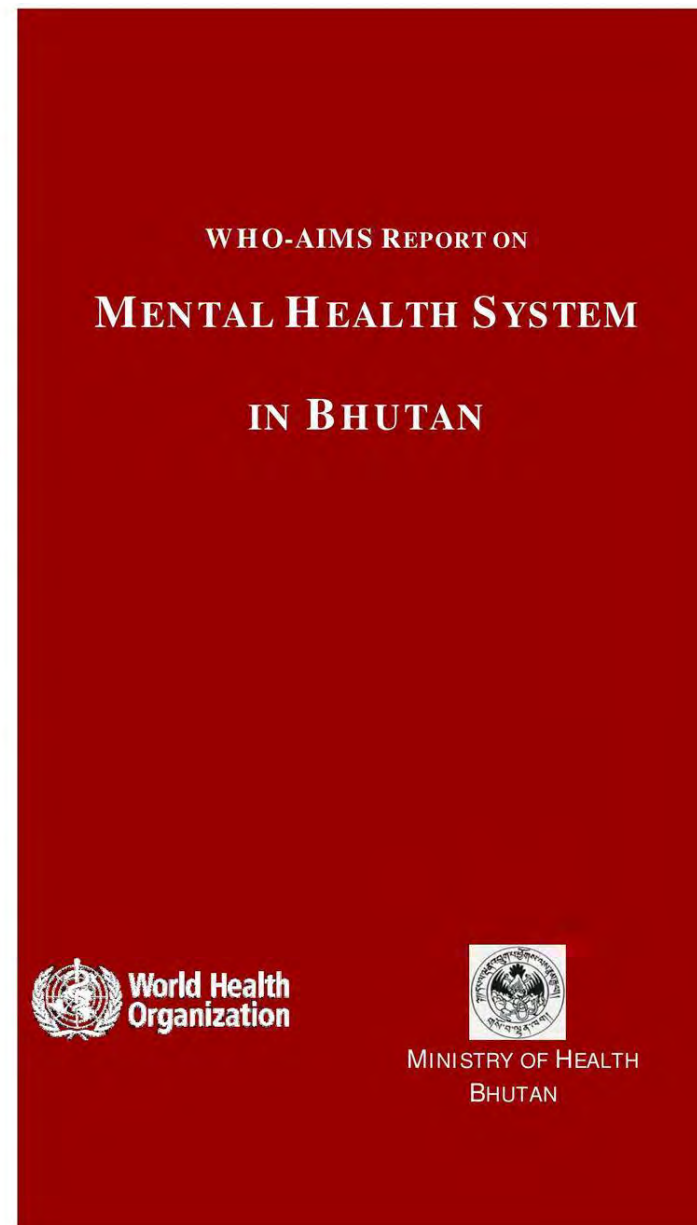
According to Felman (2020), mental health refers to cognitive, behavioral, and emotional well-being. It takes into account of how people think, feel, and behave and make a difference in one's daily living, relationships, and also physical health. Bhutan, the country located in South Asia with an approximate geographical area of 38,394 square kilometers and a population about 800,000 is also becoming to get the spotlight with the change in time. Although stigmatization of mental illness prevails in smaller pockets of the country, there are also larger section of people initiating and addressing the importance of mental health.



Photo Credit: Freepik

The mental state of the popularly known “Happy Kingdom” governed by Gross National Happiness (GNH) is projected to have all their citizens just as prosperous as their developmental philosophy itself. But then, the successful GNH philosophy does not always have to act as a shield for the Bhutanese against anxiety, depression and mental disorders. According to records maintained at the only major national referral hospital in the country, anxiety and depression are the most common mental health disorders. Moreover, the annual health bulletin also highlights the fact that there were 4,292 cases related to mental and behavioral disorders in 2018. Bhutan as of now, have only four psychiatrists and no psychologists or therapists which is scarce, given the increasing numbers of case related to mental health. As per the WHO-AIMS Report on Mental Health System in Bhutan, there are no part time or full time mental health professionals working at primary and secondary schools in Bhutan. Many Schools and Institutions, however have a school-based counsellors and health educators who conduct school based activities to promote mental health and prevent mental disorders.

WHO-AIMS



As per the national news, there are about 177 school guidance counsellors in the country. And for most of them, the counsellor-student ratio is double of what the America's School Counsellor's Association recommends: one is to 250. More so, the school counsellor have to deal with diverse cases rather than have a specific area of focus hence face challenges in competency development.

From the very young, children are taught to take care of their physical health but little is talked about taking care of one's mental well-being. In this modern times where half of the population engages in technology, snapping out self from genuine human connection, it is found essential that people pay decent attention to their mental health. Dr. Will Parks, Representative of UNICEF Bhutan pointed out that the curriculum itself in the teaching environment that exists in Bhutan can be enhanced by incorporating social and emotional learning curriculum. Advocating and educating young minds on mental well-being holds greater potential to nip off such issues from the root.


One of the Psychiatrists with the National Referral Hospital in the capital, Thimphu believes the limited resources as one of the challenges in addressing mental health issues in the country. He said the country needs more treatment and rehabilitation centers and more programmes to teach people the better ways of living. He puts emphasis on shifting from restrictive or stringent measures to more informative rehabilitative and positive ways of living things. On the bright side, it was learned that health ministry has proposed Nu 60 million in capital outlay to strengthen mental health-related interventions in the country for the 12th Plan.



Ministry of Health of Bhutan

When COVID-19 cases were being detected ever more unpredictably in different parts of the country in the early 2021, there were parts of the population who could be at risk to being mentally vulnerable due to the pandemic situation, the Jigme Dorji Wangchuck National Referral Hospital rolled out the Mental Health Response Team led by Doctor Chencho Dorji, one of the Psychiatrists which operates five National Counseling Hotline Numbers.

Bhutan's mental health policy was formulated in 1997 as part of the country's 8th Five Year Plan of development. Although Bhutan has a mental policy and plan, there is no mental health legislation according to the WHO-AIMS Report on Mental Health System in Bhutan. Despite a lack of legislation in support of people with mental health issues, there are both formal and informal collaborations to promote public education and awareness campaigns on mental health. Youth is one section of population volunteering and taking initiative to create awareness on the mental health.



MENTAL HEALTH HOTLINES

Distressed?, Anxious?, Worried?...

Talk to professional counselors if any individual is feeling stressed due to the current COVID-19 situation in the country. Please call the following mental health hotline numbers for psychosocial and mental health support:

- 17123237
- 17123238
- 17123239
- 17123240
- 17123241

Things you can do during Lockdown

- Meditate/pray
- Cook together
- Stay connected with your loved ones
- Read books/watch movies
- Help with household chores
- Exercise

FOR MORE INFORMATION: 2121 6060

www.health.gov.bt | www.facebook.com/MoHBTan | @MeHBhutan | ministryofhealthbhutan

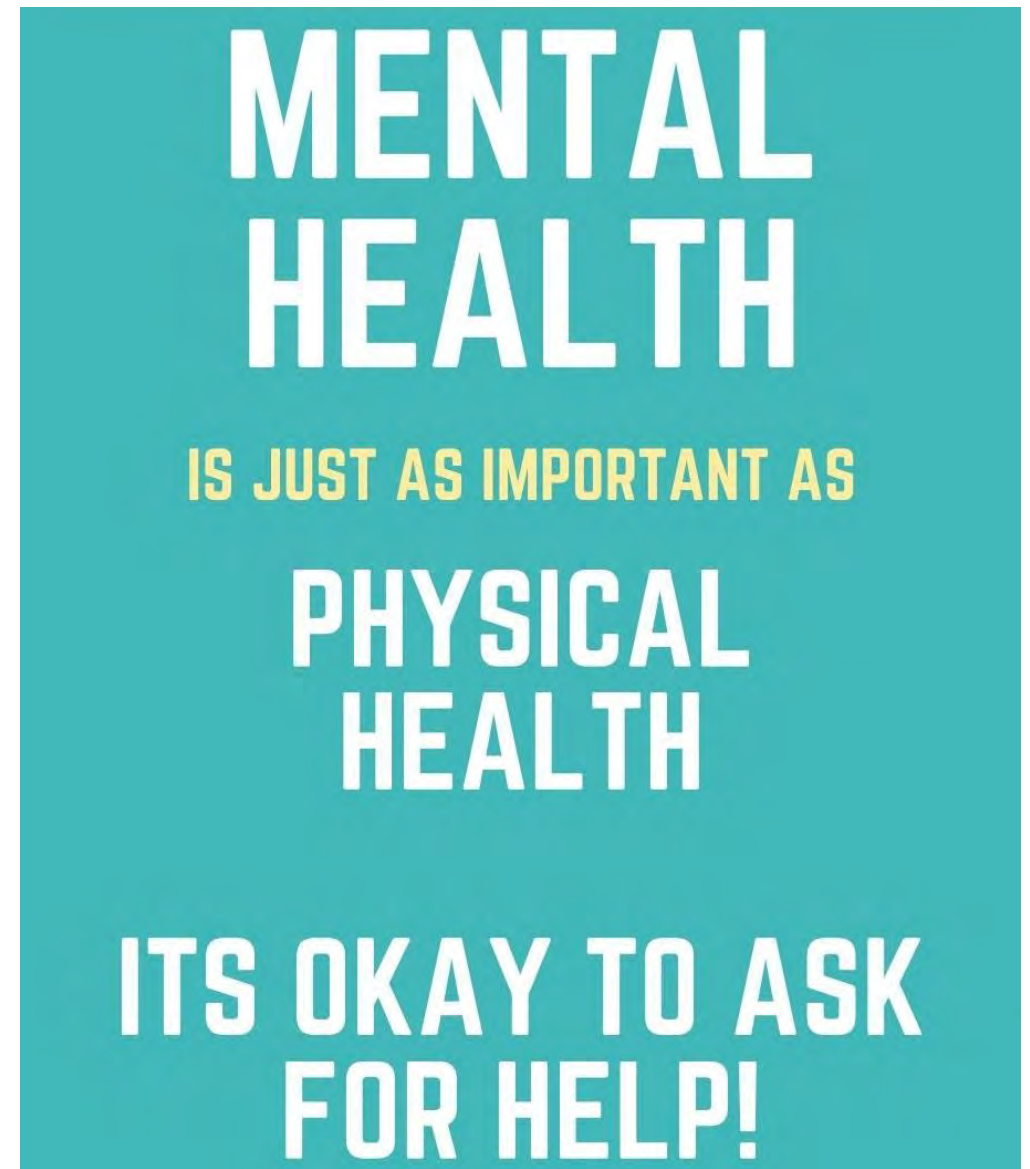
Logos for WHO, UNICEF, and other organizations.

Source: Ministry of Health

The group such as Y-PEER Bhutan is a peer education network which not only educate and disseminate information on adolescent sexual and reproductive health but equally support mental health initiatives. The discussion on suicide and the mental health issues in the parliamentarian level was the highlight of the recent national news. Knowing the requirement for the holistic approach in dealing with the mental health issue, the Civil Society Organizations (CSO) representatives submitted recommendations to study the need of legislations related to mental health and disabilities to provide legal mandates and support.

Just as much as we take care of our physical health, it is crucial we care for the mental well-being. Although our generation is gearing towards technological advancement, this shouldn't be the reason to lose the very essence of being human. To stay connected and to live life – healthy life not just physically but also mentally.

END OF REPORT FROM BHUTAN



Source: pinterest

UPDATES FROM THE PHILIPPINES



Philippine
Space
Agency



Space Technology and Applications Mastery, Innovation and Advancement
(STAMINA4Space) Program

Funded by:

Monitored by:

Implemented by:



August 16, 2021 – September 15, 2021



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Docking success!

The Dragon cargo carrying cube satellites Maya-3 and Maya-4 has successfully docked at the International Space Station (ISS) at around 10:30 PM PHT on August 30, 2021.

Stay tuned for news about the Maya-3 and Maya-4 CubeSats' deployment from the ISS in the coming weeks! Once the CubeSats are released to space, the ground team will begin to check its health and prepare for operations.



Photo captured via NASA - National Aeronautics and Space Administration live stream

Researchers win 1st place

At the student Poster Competition during the 35th Small Satellite Conference

7-12 August 2021

Congratulations to Engr. Edgar Violan and Dr. Julie Banatao, who are both Diwata-2 Satellite Engineers, for winning first place at the Student Poster Competition during the 35th Small Satellite Conference.

Their paper, titled "Development of an Operating Strategy for On-Demand Earth Observation Missions of the Diwata-2 Microsatellite," was developed through their research at the Tohoku University.



The graphic features the 'small SATELLITE' logo on the left. The main title reads '35th Small Satellite Conference Student Poster Competition Winners'. It lists three winners with their respective paper titles and authors:

- 1st place**
 - *Development of an Operating Strategy for On-Demand Earth Observation Missions of the Diwata-2 Microsatellite* • Edgar Violan, Yuji Sato, Yuji Sakamoto, Shinya Fujita, Julie Banatao, Toshinori Kuwahara, Kazuya Yoshida - Tohoku University
- 2nd place**
 - *Real-Time Satellite Component Recognition with YOLO-V5* • Trupti Mahendrakar, Ryan White, Markus Wilde, Brian Kish - Florida Institute of Technology; Isaac Silver - Energy Management Aerospace
- 3rd place**
 - *Automated Fault-Detection for Small Satellite Pointing Control Systems Using One-Sided Learning* • Yujia Huang, Phillip Ferguson - University of Manitoba

A footer note states: 'Photo courtesy of smallsat.org Grabbed from the Philippine Space Agency FB Page'.

Messages for the 1st Batch of STeP-UP Scholars

Maya-3 and Maya-4 wouldn't be possible without the support of our partners and collaborators.

Read these messages from our funding/sending/implementing institutions, collaborators, as well as messages from the Maya-1 and Maya-2 engineers.

Read more about the messages here: bit.ly/3nN5twT

STAMINA4Space Program

STeP-UP Scholars Batch 1

STeP-UP Scholars Batch 2



Secretary Fortunato de la Pena
Secretary
Department of Science and Technology (DOST)

"I commend the team who worked to accomplish this particular goal. We will aim higher of course. I feel fortunate about having our first batch of STeP-Scholars, who in spite of diversity of backgrounds in science and were able to accomplish their tasks within the given time frame."



Dr. Gonzalo Campoamor II
Vice Chancellor for Research and Development
University of the Philippines Diliman

"Almost all Filipinos in our childhood had hoped to become part of a space-related venture someday. You guys have fulfilled it and are all set to dive even deeper. My warmest congratulations to everyone! And never ever forget, paglingkuran ang sambayanan! UP Fight!"



Dr. Joel Joseph Marciano, Jr.
Director-General
Philippine Space Agency (PhilSA)

"When we sent Filipino scholars to Kyutech to work on Maya-1 in 2016 and Maya-2 in 2018, we committed to the idea of being able to build and innovate future Maya cubesats in our own laboratories. With Maya-3 and Maya-4 being lifted up to the ISS today, we achieve that proximate objective," he said. "This accomplishment spurs us on toward our larger goal of growing local space capabilities and cascading them to industry and society. I thank and congratulate the scholars, their mentors, and everyone in the team for their hard work, and look forward to more Mayas and breakthroughs to come."



Dr. Josette Biyo
Director
Department of Science and Technology Science Education Institute (DOST-SEI)

"I commend the team who worked to accomplish this particular goal. We will aim higher of course. I feel fortunate about having our first batch of STeP-UP Scholars, who in spite of diversity of backgrounds in science and engineering, were able to accomplish their tasks within the given time frame."

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Ferdinand Manegdeg
Dean
College of Engineering
University of the Philippines Diliman

"Continue to trailblaze and contribute the country's space initiatives. You've achieved a great deal for yourself and for our nation. Not everyone can be a STeP-UP scholar; you are a select few. I admire you for maximizing this so that our kababayan can benefit your talents."



Prof. Mengü Cho
Principal Investigator, Joint Global Multi-Nation BIRDS Network
Director, Laboratory of Lean Satellite Enterprises and In-Orbit Experiment (LaSEINE)

"It is my pleasure to continue working with the Philippine teams. The collaboration benefits not only the Philippine side but also the Japanese side. Kyutech team including students learn many things and improve ourselves through the collaboration. Maya-3 and 4 are the first examples of applying BIRDS satellite bus to abroad. I am delighted to see the DNA of the BIRDS program is inherited and evolves in developing countries."



Prof. George Maeda
Assistant Professor
Kyushu Institute of Technology (Kyutech)

"I am delighted that the Philippines is forging ahead with in-country capacity building. This is a vital undertaking - and not all BIRDS nations have conscientiously followed through. I am confident that the Philippines will continue to challenge its young people in terms of space development."



Dr. Michael Angelo Pedrasa
Director, Electrical and Electronics Engineering Institute
University of the Philippines Diliman

"Congratulations to the pioneering batch of STeP-UP scholars. Being the very first is exciting, but is also fraught with uncertainty. The curriculum is new and the teachers, although existing faculty of EEEL, are handling some of the courses for the first time. Add to that is the pandemic - the second semester of AY 2019-2020 being cut short and the shift to remote learning, with its own set of challenges. However you have soldiered on and have accomplished this amazing first."

Messages for the 1st Batch of STeP-UP Scholars

Maya-3 and Maya-4 wouldn't be possible without the support of our partners and collaborators.

Read these messages from our funding/sending/implementing institutions, collaborators, as well as messages from the Maya-1 and Maya-2 engineers.

Read more about the messages here: bit.ly/3nN5twT



Paul Jason Co
Project Leader
STeP-UP Project
STAMINA4Space Program

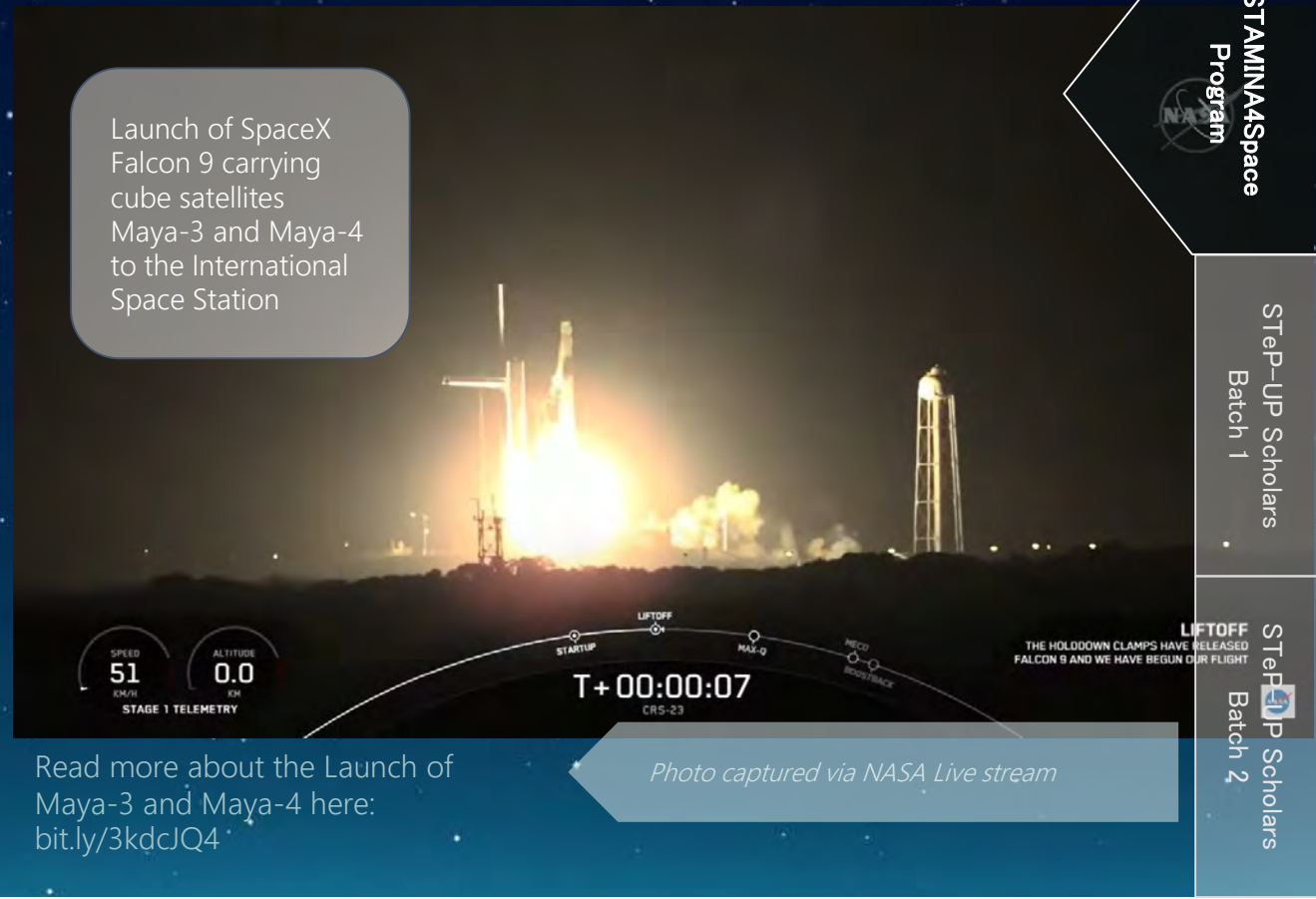
"My hope is that the local space industry will continue to grow so that future engineers and scientists will think of space technology as a reality here at home and not a dream that has to be chased abroad."



Dr. Maricor Soriano
Program Leader
STAMINA4Space Program

"Congratulations to our first batch of home-grown STEP-UP scholars for this important milestone. Clearly, the mission to strengthen our local space industry and increase our knowhow continues beyond the launch. Despite the challenges brought about by the pandemic you persevered. Beyond the product and expertise, please also remember the life skills you learned from your training - teamwork, clarity, grit, and self-confidence. Cheers and Padayon!"

Launch of SpaceX Falcon 9 carrying cube satellites Maya-3 and Maya-4 to the International Space Station



Read more about the Launch of Maya-3 and Maya-4 here: bit.ly/3kdcJQ4

Photo captured via NASA Live stream

STAMINA4Space Program

STeP-UP Scholars Batch 1

STeP-UP Scholars Batch 2



WELCOME

to UNISEC Philippines!



Mariano Marcos State University

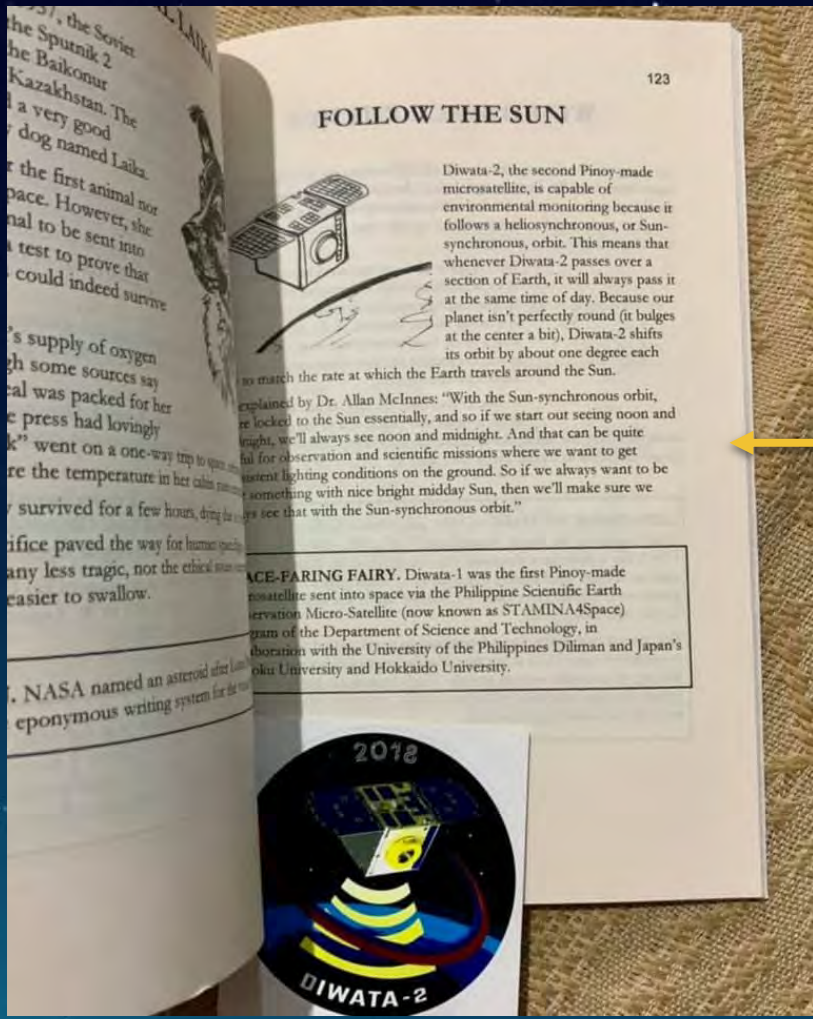


New UNISEC Philippines Member

We would like to welcome the Mariano Marcos State University to University Space Engineering Consortium (UNISEC) Philippines!

We are glad that more universities are becoming part of space science and technology proliferation initiatives in the country. We are looking forward to collaboration!

MMSU is the 12th academic institute to join the Philippine chapter of the UNISEC, which is managed by the Space Science and Technology through University Partnerships (STeP-UP) Project of STAMINA4Space. Member universities gain access to information and knowledge exchange, capacity building, and other educational tools and resources related to space science, technology, and engineering.



FEATURED!

Diwata-1 was spotted in "Science Scramble: Over 200 Amazing Facts and Incredible Stories" written and illustrated by Mr. Mikael Francisco of FlipScience.

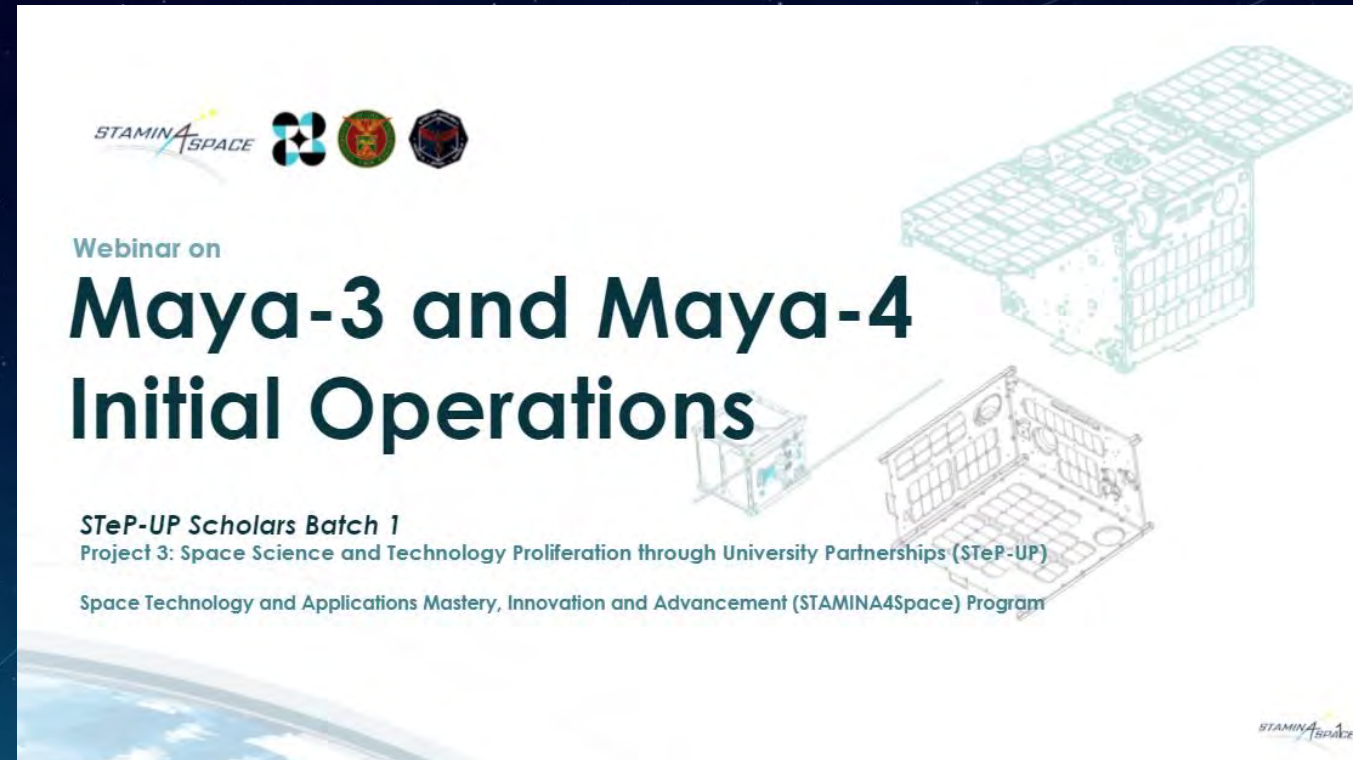
The Philippine satellites were also featured in the Development Journal Japan, showing various stages of the satellites' development phase.





Webinar on Maya-3 and Maya-4 Initial Operations

August 20, 2021



PREPARED BY:

Gladys A. Bajaro
Derick B. Canceran
Bryan R.

Custodio

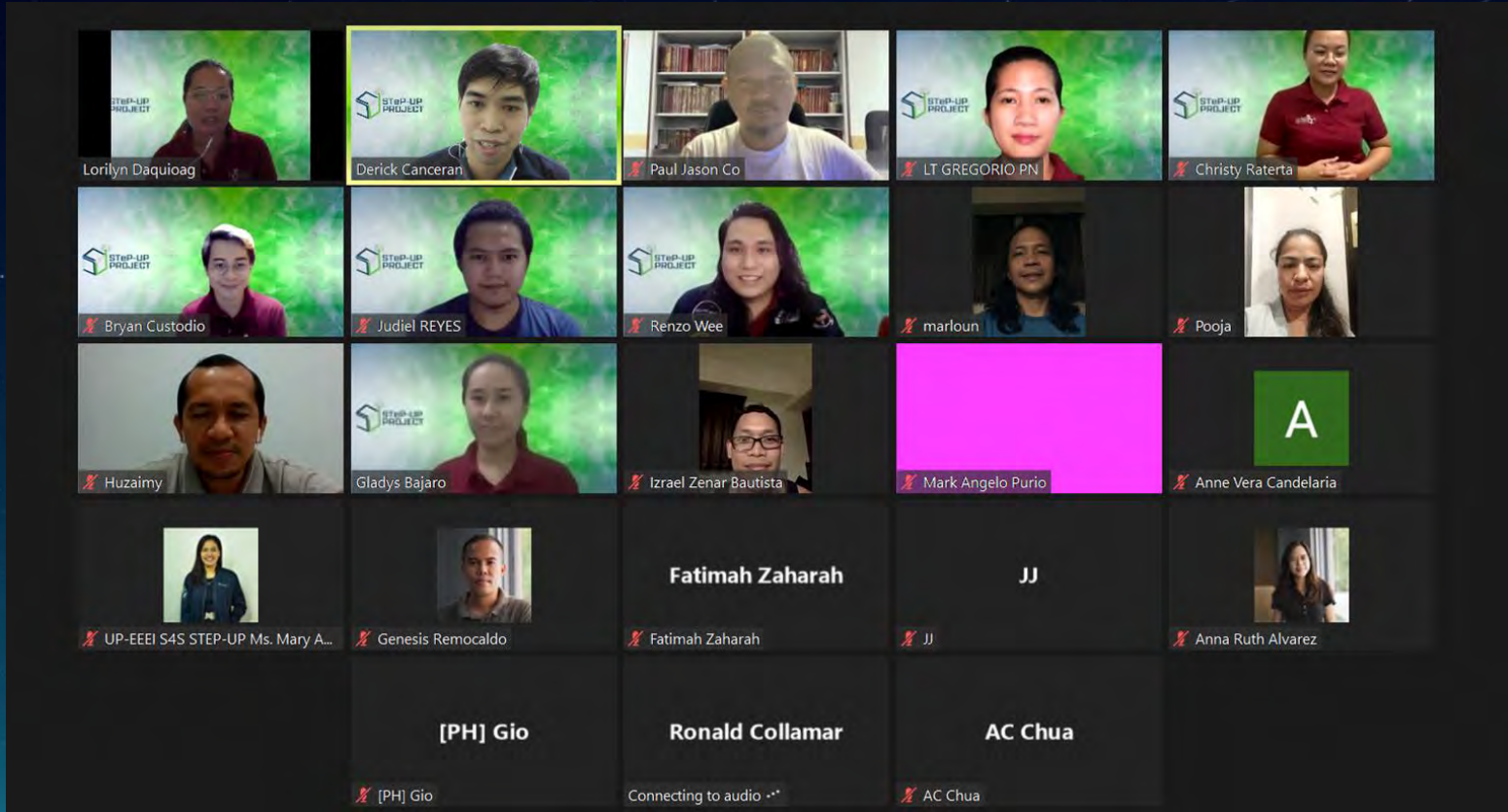
Lorilyn P. Daquiaoag
Marielle M. Gregorio
Christy A. Raterta
Judiel L. Reyes
Renzo S. Wee

Contributing Writers

On August 20, 2021, the first batch of the STeP-UP scholars conducted a webinar for the BIRDS GS network. The team presented the operations plan and demonstrated the Maya-3 and Maya-4 CW beacon decoder.

Webinar on Maya-3 and Maya-4 Initial Operations

August 20, 2021



The event was attended by STeP-UP Project Leader Engr. Paul Jason Co; Dr. Mohamad Huzaimy from UiTM, Malaysia; STeP-UP members; second batch of STeP-UP scholars; and BIRDS ground station operators from Japan, Malaysia, and Philippines.

We would like to express our gratitude to everyone who expressed their support in tracking and monitoring Maya-3 and Maya-4.

Philippine Space Agency

STAMINA4Space Program

STeP-UP Scholars Batch 1

STeP-UP Scholars Batch 2

Maya-3 and Maya-4 successful launch to ISS

August 29, 2021



August 29, 2021 at 3:14 P.M. (PST) - This is the time when the Maya-3 and Maya-4 CubeSats were successfully launched to the ISS aboard a SpaceX Falcon 9 rocket Dragon C208 as part of SpaceX Commercial Resupply Mission-23 (SpX-23).

On the next day (August 30, 2021), SpaceX's CRS-23 Cargo Dragon was successfully captured and docked with the ISS.

Image Source: NASA

Maya-3 and Maya-4 successful launch to ISS

August 29, 2021



Philippines' CubeSats Maya-3, Maya-4 officially launched to International Space Station

Published August 29, 2021 5:02pm



Republic of the Philippines
Office of the President
PhilSA
Philippine Space Agency

Philippine Standard Time
Monday 8th of September 2021
09:34:13 PM

Maya-3 and Maya-4 CubeSats launched to International Space Station

Posted by: STAMINA4Space Program 31 August 2021



Two PH-made cube satellites launched into space

By CNN Philippines Staff
Published Aug 29, 2021 3:35:24 PM



PH-made cube satellites to be launched to space with NASA's SpaceX mission

ABS-CBN News
Posted 8 Aug 28 2021 8:22 AM



NEWS 5 DIGITAL

photo courtesy - STAMINA4Space



2 CUBE SATELLITES NA GAWA SA PILIPINAS, ILA-LAUNCH NA SA OUTER SPACE

Nakatakdang i-launch sa International Space Station (ISS) sakay ng SpaceX Falcon 9 Dragon C208 rocket ang mga nanosatellite na Maya-3 at Maya-4 ngayong Sabado, Aug. 28, 3:37 p.m.

News5Everywhere @news5ph News5.com.ph

The launch of Maya-3 and Maya-4 CubeSats were featured on several media outlets, bringing the latest Philippines initiatives and efforts for Space Science and Technology closer to the public.



DOST BREAKING NEWS 1:09

PHILIPPINES' FIRST UNIVERSITY-BUILT SATELLITES, MAYA-3 AND MAYA-4, HAVE BEEN OFFICIALLY LAUNCHED TO ISS



The Manila Times

OPINION NEWS REGIONS WORLD BUSINESS SPORTS

PH launches 2 satellites



PH cube satellites Maya-3, Maya-4 launched

AUG 31, 2021 11:10 AM PHT
DELO GONZALES

Philippine Space Agency

STAMINA4Space Program

StE-P-Up Scholars Batch 1

StE-P-Up Scholars Batch 2

STeP-UP scholars interviewed by media stations

Maya-3 and Maya-4 developers were invited by several media stations to talk about the CubeSats, the members of the team, their experiences, and other related ongoing space science and technology projects in the Philippines.



Photo: Captured from Radyo Pilipinas Lucena live steam LAYAG MIMAROPA - August 31, 2021



Photo: Captured from Radyo Pilipinas Lucena live steam DXND Radyo Bida Kidapawan City - August 31, 2021



Photo: Captured from Balitang Bicolandia September 8, 2021



Photo: Captured from NET 25 live steam NET 25 Kada Umaga - September 9, 2021



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Contributing Writers

VOLTAGE MONITORING PROCEDURE



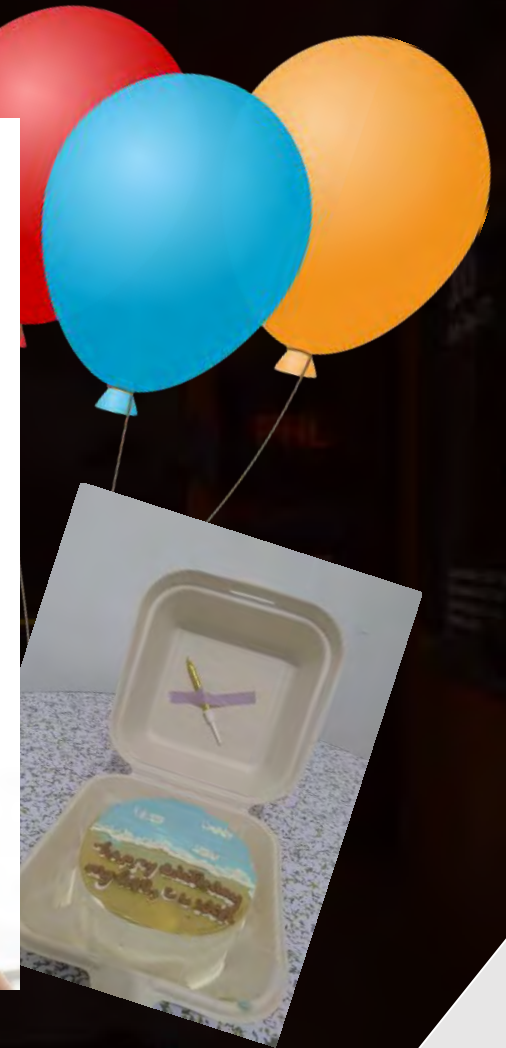
Battery Voltage, Raw Voltage, and Solar Panel/External Source Voltage Monitoring Setup

There are three important voltages that should be monitored during functionality tests and evaluations on Maya-5 and Maya-6 CubeSats: Solar Panel voltage (SRC_V), Raw voltage (RAW_V) and Battery voltage (BATT_V). All of these voltages can be accessed via J4 of the front access window at FAB. The images above show the different setups for measuring them.

HAPPY BIRTHDAY TIMM!

The team wishes Timm (heh) a happy happy birthday! He celebrated his 25th birthday on September 1, 2021 with a cake from his loving girlfriend . His hobbies include video games, reading books, and taking online courses.

Cheers, Timm!





BPN Español

- No. 7 -

Fatima Duran

El Salvador

Estudiante SEIC/PNST

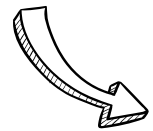
2021.09.15

Noticias

¡Hola! En esta columna #7 de BPN Español te compartiré un poco sobre algunas noticias recientes en Kyutech.

Según el reporte de **BryceTech**, empresa de análisis e ingeniería que brinda consultoría para programas gubernamentales y empresarial, **Kyutech** se posiciona nuevamente como el **operador número 1 de pequeños satélites** en el sector académico, con un total de 16* satélites.

*Dato actualizado: 21 satélites.



Para más información...

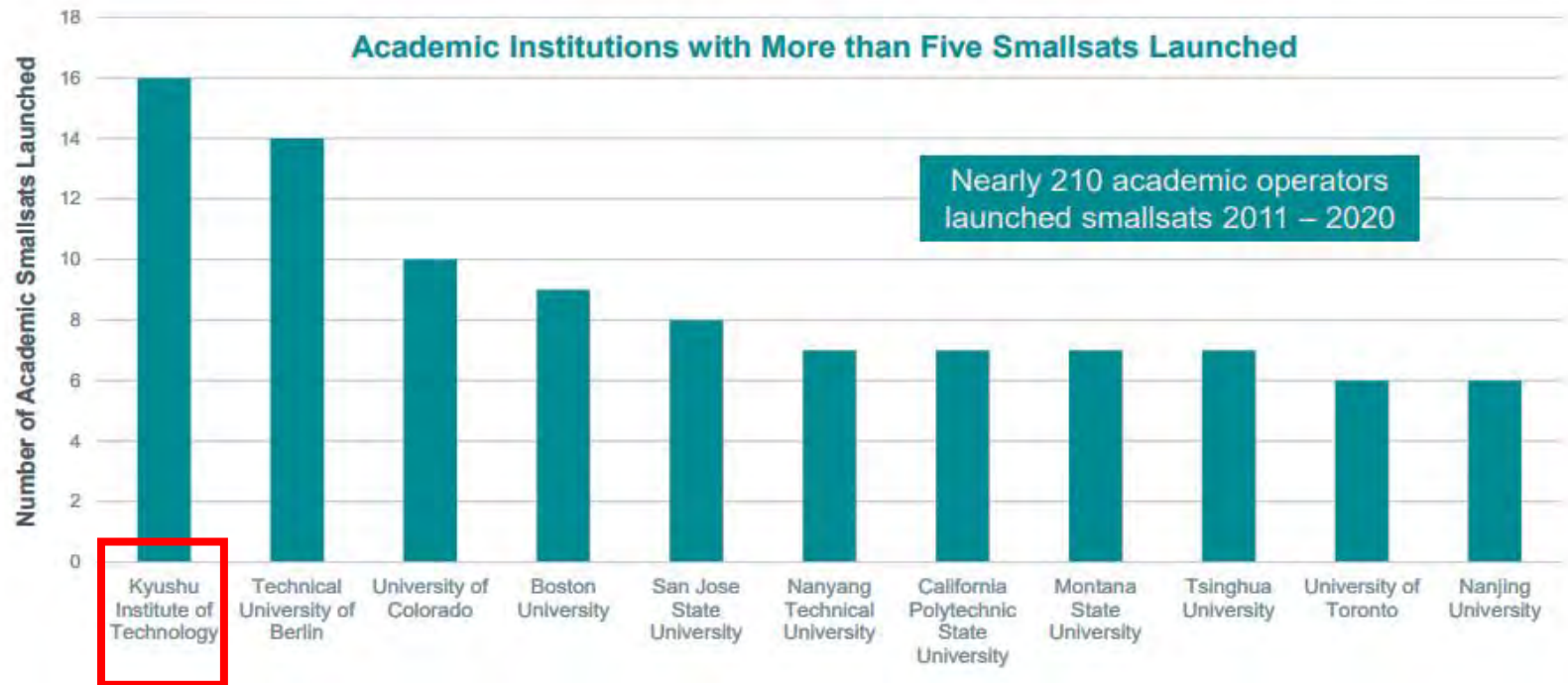
https://brycotech.com/reports/report-documents/Bryce_SmallSats_2021.pdf

Operador académico No.1 de pequeños satélites

Number of Academic Smallsats 2011 – 2020, by Institution

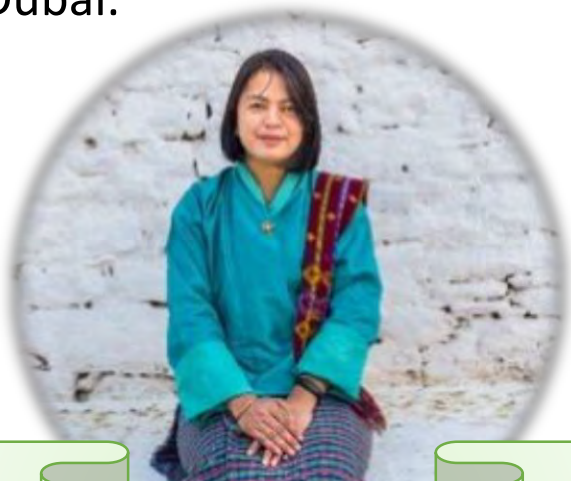


Smallsats in Context and Operator/Mission Type Trends



Noticias

Tres estudiantes de Kyutech han sido seleccionados como **Líderes Espaciales Emergentes** para la Conferencia Internacional Astronáutica (IAC, por sus siglas en inglés) a realizarse del 25 al 29 de octubre en Dubái.



Pooja Lepcha
(Bután)

Estudiante de 2º año de doctorado



Hari Shrestha
(Nepal)

Estudiante de 1º año de doctorado



Fahd Moumni
(Marruecos)

Estudiante de 2º año de maestría



Para más información...

<https://www.iafastro.org/news/the-iaf-is-proud-to-introduce-the-2021-iaf-emerging-space-leaders.html>


¡Muchas felicidades!



PNST: Noticias

Este mes abrió la convocatoria al programa “**Estudio de Posgrado en Tecnologías de Nano-Satélite**” (**PNST**, por sus siglas en inglés) organizado por la Oficina de Naciones Unidas para Asuntos del Espacio (UNOOSA, por sus siglas en inglés) y el gobierno de Japón en cooperación con Kyutech. Cada año, se selecciona un total de seis estudiantes: Tres estudiantes para maestría y tres estudiantes para doctorado, respectivamente.

¿Por qué PNST?



Además de tener acceso a amplias oportunidades de investigación en sistemas de nanosatélites, también podrás ser parte de un proyecto para el desarrollo de un nanosatélite. Esto te permitirá, no solo adquirir y desarrollar habilidades técnicas pero también te brindará la oportunidad de ser parte de un equipo multicultural y aprender tanto del proyecto como de cada uno de los miembros y su experiencia.

Documentos para aplicar a PNST

- ✓ Formulario de nominación.
- ✓ Formulario de aplicación.
- ✓ Cartas de recomendación
- ✓ Historial académico (notas).
- ✓ Formulario de aplicación para la beca MEXT.
- ✓ Plan de estudio e investigación.
- ✓ Lista de verificación de documentos (checklist)

- Para más información sobre PNST:

<https://www.unoosa.org/oosa/en/our-work/psa/bsti/fellowships.html>



Fecha límite para aplicar al programa PNST:

- **10 de enero de 2022**
- **23:00 JST**

END OF COLUMN #7



OLAYINKA'S WORLD

24. Olayinka's World – Column #24

COLUMN NO 24

OLAYINKA FAGBEMIRO

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



NIGERIA SETTING THE PACE FOR THE GRADUAL RISE OF AFRICA INTO SPACE RESEARCH THROUGH THE IASC ASTEROIDS SEARCH CAMPAIGNS

A team of Nigerians in Space Science, under the umbrella of Astronomers Without Borders Nigeria (AWBNigeria), were among those who discovered asteroids during the just concluded asteroid search campaign organized by International Astronomical Search Collaboration (IASC), a NASA affiliate under which this search campaign was carried out. The Nigerian team made these discoveries through analyzing some image sets by using a special computer software called Astrometrical. These image data are taken by the PAN – STARRS, a telescope at the University of Hawaii.

These asteroid search campaigns allow participants around the world to make important discoveries of Main Belt asteroids (MBAs) and occasionally of trans-Neptunian objects (TNOs). Image data for general asteroid search campaigns are provided by the Institute for Astronomy (IfA) at the University of Hawaii. IfA uses the 1.8-m Pan-STARRS telescope located on Haleakalā to take images along the ecliptic where most asteroids are found.



The AWB Nigeria team, led by Miracle Chibuzor Marcel, a graduate of Physics and Astronomy of the University of Nigeria Nsukka, had participants ranging from university undergraduates and young professionals from diverse STEM backgrounds, drawn from different parts of the country.

During the entire search window, twenty-seven sets of images were received by the team at different time intervals, out of which tens of unknown moving asteroids were detected. At the end of the campaign, it was confirmed that the Nigeria team has made three preliminary discoveries of 3 different asteroids: P11iDr9, P11iEYU and P11iEZq.

Team Nigeria received accolades from Cassidy Davis, the IASC coordinator for their efforts. In the coming months, their observations will undergo further studies which include determining the asteroids' orbits and orbital parameters, after which the discoverers will finally have the opportunity to name their discoveries.

According to available information on International Preliminaries, it was observed that Nigeria, Ghana and Benin Republic, which were trained by the AWB Team leader, were the only African countries that participated from the Sub Saharan region. These countries also made preliminary discoveries. The AWB team hopes to coordinate more African countries to be a part of future asteroids search.



The **AWB** Team posing with their certificates



Astronomers Without Borders

End of this column from Nigeria





UiTMSAT COLUMN

Column No. 21

Editor: FATIMAH ZAHARAH BINTI ALI (ali.fatimahzaharah@gmail.com)
PHD CANDIDATE, LABORATORY OF SPACE WEATHER AND SATELLITE SYSTEM
SCHOOL OF ELECTRICAL ENGINEERING, COLLEGE OF ENGINEERING
UNIVERSITI TEKNOLOGI MARA (UiTM), SELANGOR, MALAYSIA

25. Column #21 from Malaysia



UNIVERSITI
TEKNOLOGI
MARA

*UiTM Sentiasa Di Hatiku
"UiTM Always in My Heart"*



ASEANSAT

ANTENNA DEPLOYMENT MECHANISM PROTOTYPE FOR ASEANSAT PROJECT OF 1U NANOSATELLITE

ASEANSAT Project has currently completed the system engineering phase where the satellite's system operation has been presented and contemplated successfully among the team members of the project and the panel. The next phase is now to develop the bus systems and mission payloads based on the presented system operations flow with the reference of BIRDS Nanosatellite Project. In this issue, we present a brief about the testing mechanism of one of the subsystems of the spacecraft, that is the Antenna Subsystem. The person-in-charge (PIC) of the subsystem is Mr Nik Amirul Aiman.



Author: NIK AMIRUL AIMAN BIN RAHMAT (RESPONSIBLE IN ANTENNA & COMMUNICATION SUBSYSTEMS OF ASEANSAT PROJECT)

e-mail: amirulaiman2999@gmail.com

**PhD CANDIDATE, LABORATORY OF SPACE WEATHER AND SATELLITE SYSTEM
SCHOOL OF ELECTRICAL ENGINEERING, COLLEGE OF ENGINEERING
UNIVERSITI TEKNOLOGI MARA (UiTM), SELANGOR, MALAYSIA**

As the PIC for the Communication and Antenna subsystems of the ASEANSAT project, I am currently developing the prototype of the –Y panel, also known as the antenna board. The polyethylene or polythene (PE) material as shown in Figure 1 is used as a mock-up of the antenna board which originally uses the FR4 material. The antenna holder is then 3D printed by using a PLA+ based material as shown in Figure 2. Prior to mount the antenna holders with the mock-up board, several details are required to be considered such as the placement of the holders, and the dimension of the screws that will be used to secure the holders on the board.

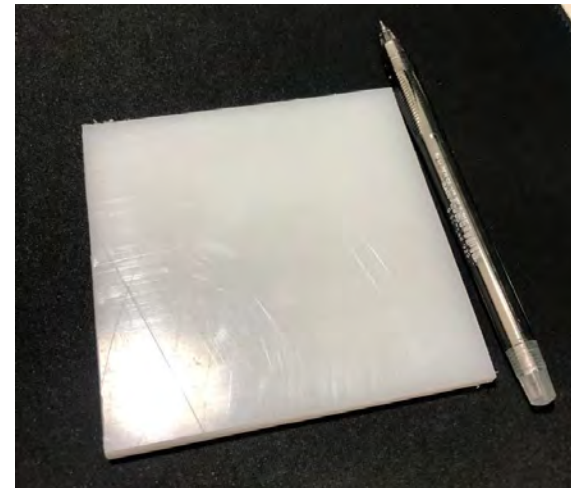


Figure 1: Polyethylene (PE) material is used as antenna's mock-up board.

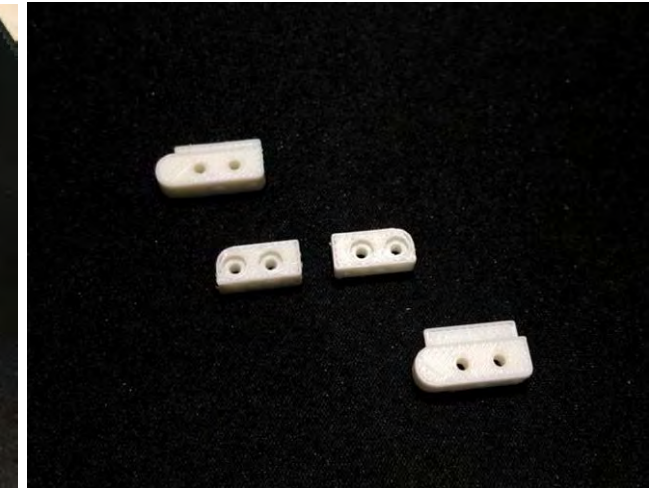


Figure 2: Antenna holders that were printed using 3D-printer.

Figure 3 shows the antenna holders mounted on the PE material while Figure 4 shows the three (3) additional screws or washers which will be used as an anchor points to stow the antenna in place.

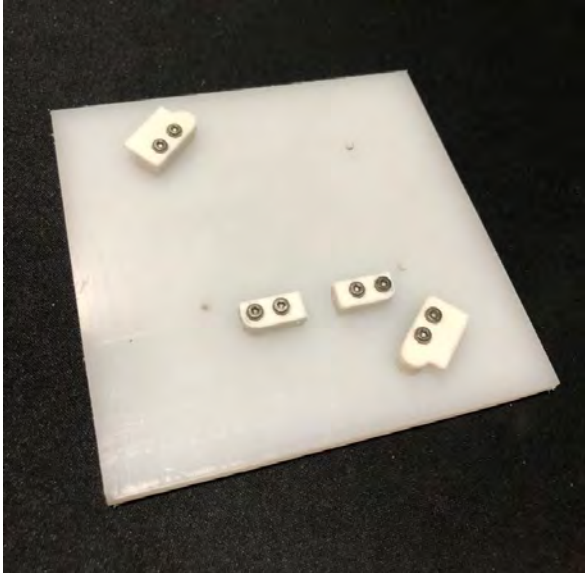


Figure 3: Antenna holders were attached on the mock-up board using screws based on the antenna board design.



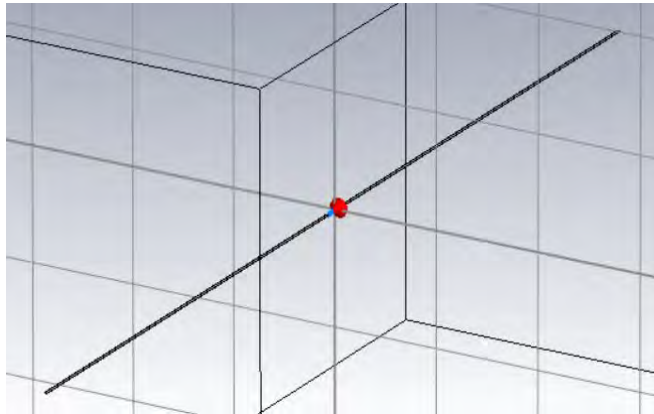
Figure 4: Additional three (3) screws or washers were used as anchor points on the mock-up board.

A steel as shown in Figure 6 is cut into specific lengths as dipole antennas. The longer steel with length about 487mm will act as VHF dipole antenna while the shorter steel with length of 183mm will be used for UHF transmission antenna.

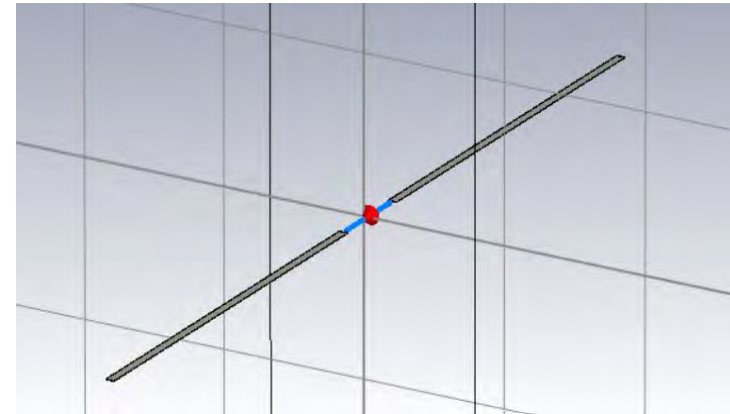


Figure 5: The steels that were cut into specific length as dipole antenna.

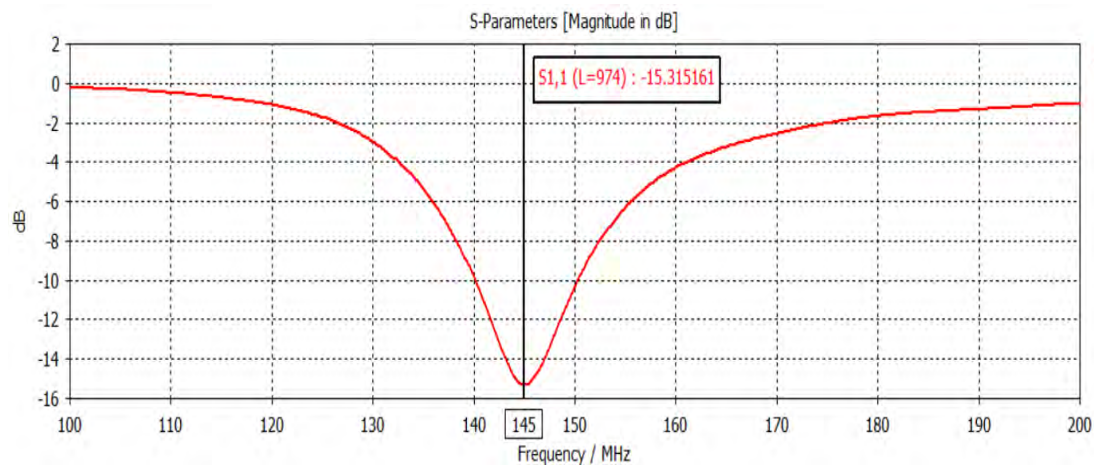
Simulations by using CST software have been done beforehand to determine the optimum length for a high efficiency transmission for both antennas as shown in Figure 6 and Figure 7.



(a)



(a)



(b)

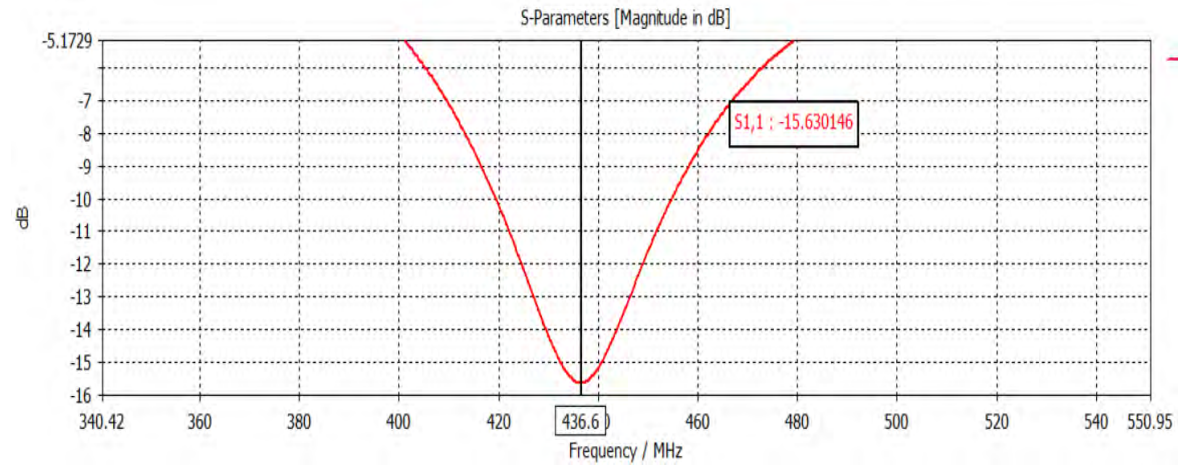


Figure 7: (a) The design of UHF dipole antenna in CST Software. (b) The S11 simulation results of the designed UHF dipole antenna.

Figure 6: (a) The design of VHF dipole antenna in CST Software. (b) The S11 simulation results of the designed VHF dipole antenna.

The antennas are then attached to the antenna's mock-up board as shown in Figure 8. The antennas will be tied up accordingly using fishing string in order to stow their positions on the board before they are being deployed. Additionally, a burner circuit is required for the deployment of the antenna as it will burn up the fishing string that tied the antennas.

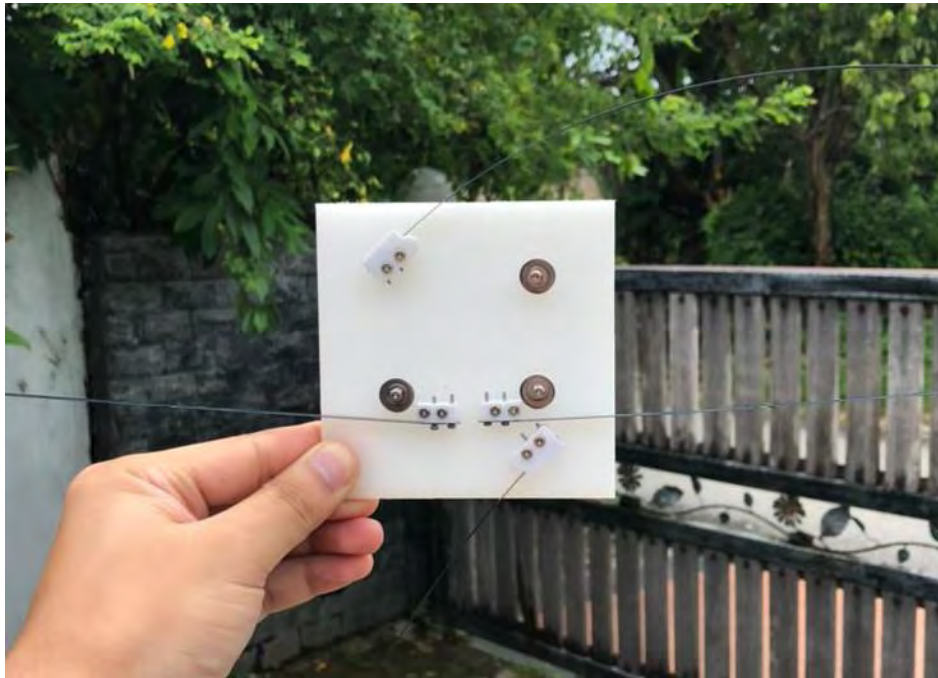


Figure 8: The antennas were attached on the board before they were stowed and tied using fishing string.

Figure 9 shows the breadboard model of the burner circuit by using an LED to represent the nichrome wire, while a mechanical relay is used to represent the photoMOS relay. The design of the burner circuit is still under an ongoing process. The burner circuit will be placed on the antenna board and the attached nichrome wire will act as burner to break the fishing string that tied up the antennas. This is a process to deploy the antennas onboard the satellite.

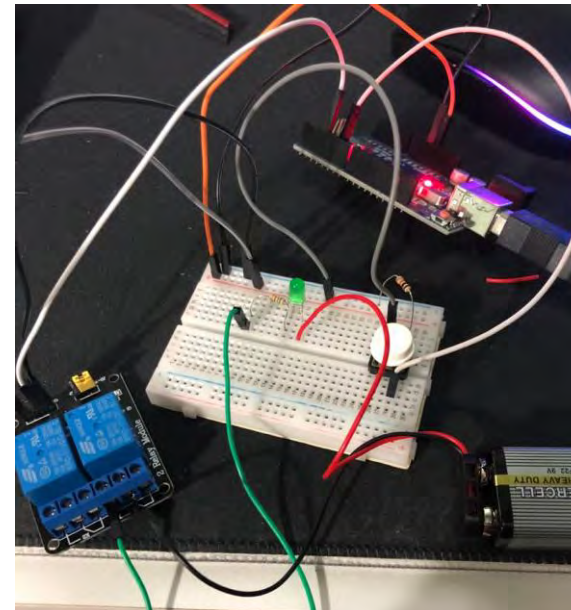


Figure 9: A model of burner circuit that was tested on a breadboard. This model will be used to test the functionality of the circuit to burn the fishing string for antenna deployment.

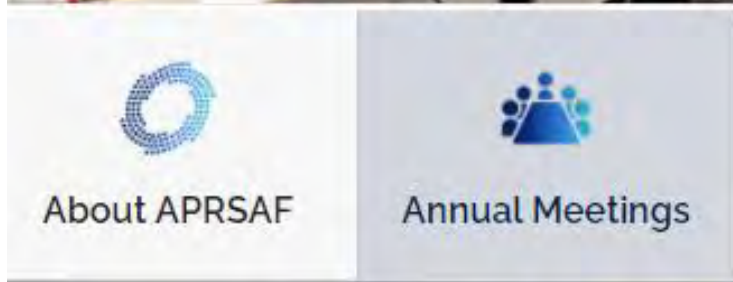
End of Malaysia's Column

26. Kyutech and UNISEC chair a session on higher education at APRSAF-27

The 27th session of the Asia-Pacific Regional Space Agency Forum (APRSAF-27) is co-organized by the following organizations:

Vietnam: Vietnam Academy of Science and Technology (VAST)

Japan: Ministry of Education, Culture, Sports, Science and Technology (MEXT) and Japan Aerospace Exploration Agency (JAXA)



Day2: December 1 (Wednesday) 13:00-17:00 [Vietnam time]

Co-Chairs: Ms. SASAKI Kaori, Director, JAXA Space Education Center

Dr. Le Xuan Huy, Vice Director General, VNSC

	Vietnam time	Subject
6	13:00-13:10	Opening of the Day 2 (Review of the Day 1)
7	13:10-14:10	Space Education for All people Part 1: Primary and Secondary Education
8	14:10-14:40	Joint educational activities for educators and young people - Flash report on this year's Online Water Rocket Event - Flash report on this year's Online Poster Contest - Next Poster Contest Theme - Launch of the works of APRSAF poster contest 2020

Chair: Prof. CHO Mengu, Professor, UNISEC & Kyushu Institute of Technology

Dr. Le Xuan Huy, Vice Director General, VNSC

	Vietnam time	Subject
9	14:50-16:40	Space Education for All people Part 2: Higher Education - Project-based Education on Space Engineering - Government Policies in Support of Space Education

REGISTER FOR APRSAF-27 AT THIS WEBSITE:

https://www.aprsaf.org/annual_meetings/aprsaf27/meeting_details.php



GST Column

11th Issue:

Updates from GST Network

by Pooja Lepcha, 15 Sept. 2021

The GST Network warmly welcomes new members:



Barsbold Bayansan (Mongolia)

He is Master student of Nano Satellite Development Laboratory, National University of Mongolia (NUM) and member of Mongolian Space Technology Association (MOSTA).

He received bachelor degree in Physics and Electronics Engineering from National University of Mongolia.

Research interest includes the electronic system, embedded system, and satellite wireless communication. He is the main Ground Station Terminal Developer in Mongolia.

Application: Collect the environmental data using the GST

Currently, he is working on the “Temuulel” satellite project which is the Mongolian second satellite.

The GST Network warmly welcomes new members:



- **Yu-Sheng Liu (Sam)**
- Bachelor student of Department of Aeronautics and Astronautics in NCKU. He joined *SpaceLab* of NCKU as the student researcher this year. System engineering and project management are what he is interested. Now he takes over the GST project of Taiwan from Gary.

The GST Network warmly welcomes new members:



Sagar Koirala

Comm Lead

Sagar Koirala is a 19-year-old high school graduate student who is currently working on GST project with Antarikchya Pratisthan Nepal. He aims to specialize on Communication systems for Satellite and Space technologies.

Bikalpa Dhungana

Structure Lead

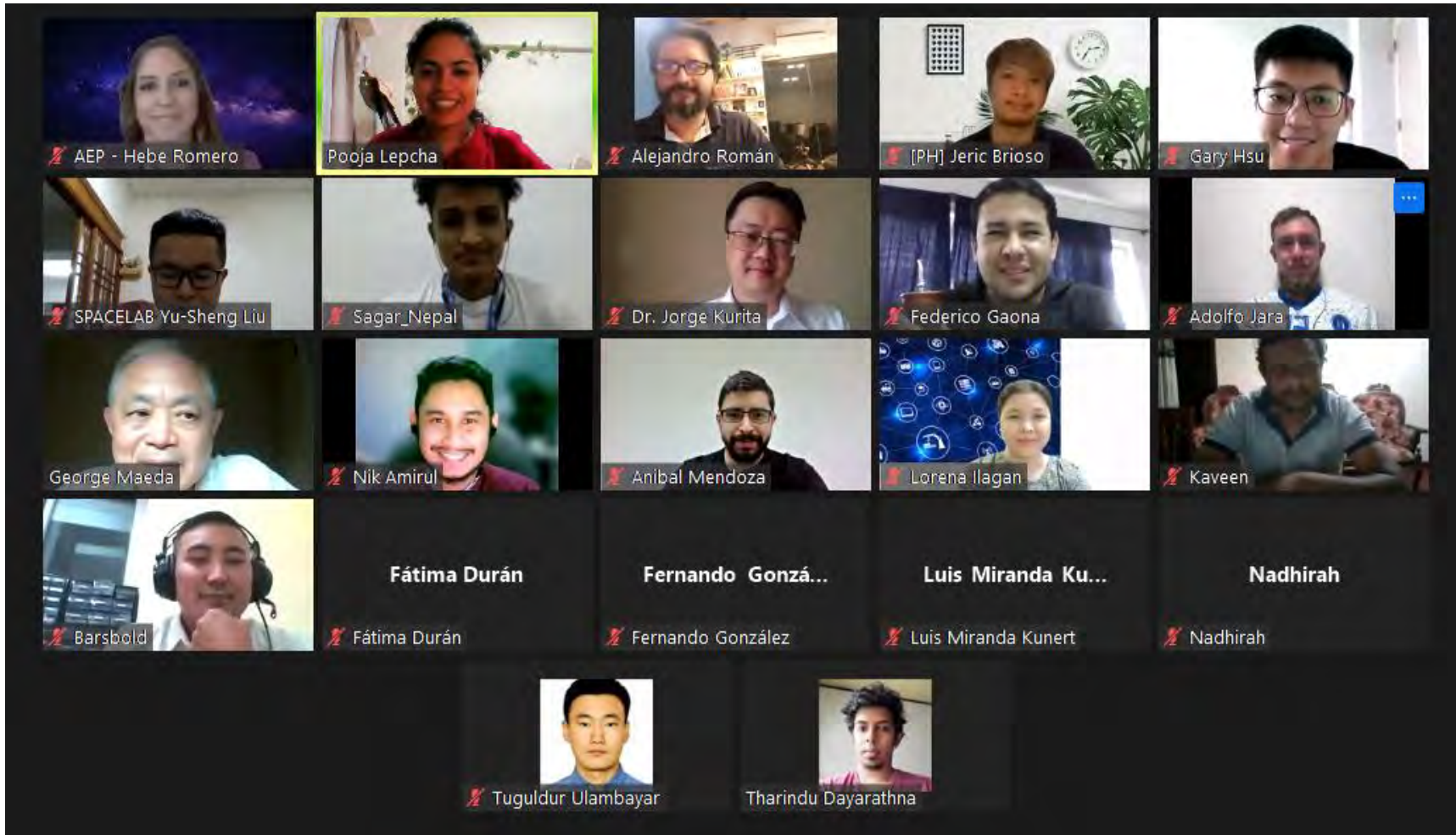
Structure Designer at Antarikchya Pratisthan Nepal.

Currently enrolled in BED Health and Physical at Purbanchal University, Nepal. Working experience of more than 1 decade, in science and technological innovation, with an ambitious dream of innovating something to help the marginalized community of Nepal. Felicitated with the Prime Minister Grant 2075 and National Youth Award 2071 by Government of Nepal.



Updates

A GST meeting was held on 26th August 2021 ... good turn-out!



Participants from:

1. Paraguay
2. Malaysia
3. Philippines
4. Sri Lanka
5. Taiwan
6. Mongolia
7. Nepal

Updates from GST Network



Mongolia



Malaysia



Taiwan

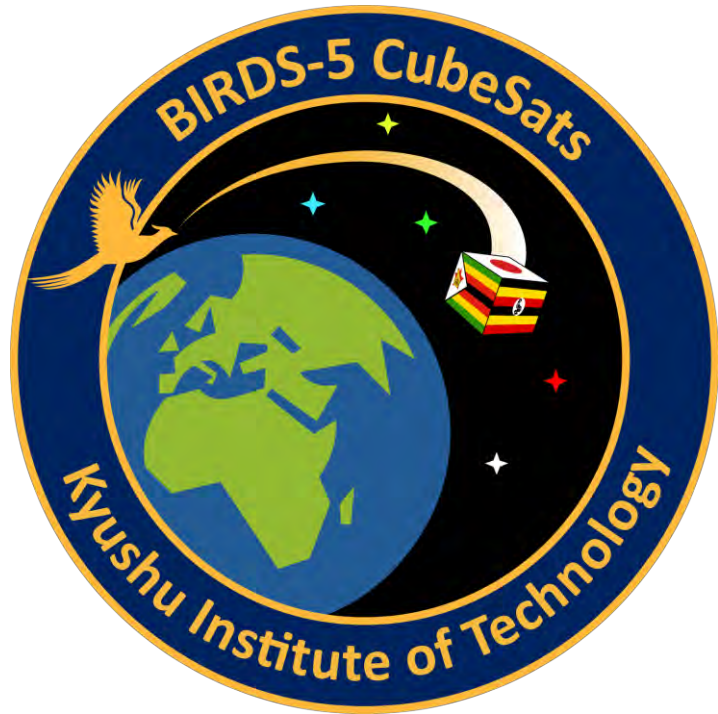


Nepal



Paraguay →

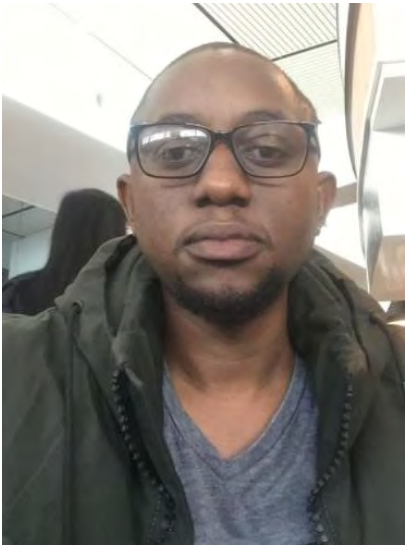
END OF GST COLUMN NO. 11



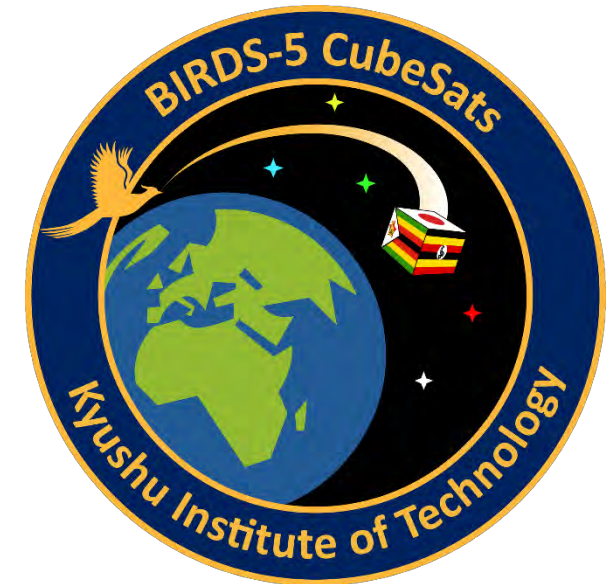
The following sections are the BIRDS-5 articles for September 2021

(compiled by Timothy of Zimbabwe)

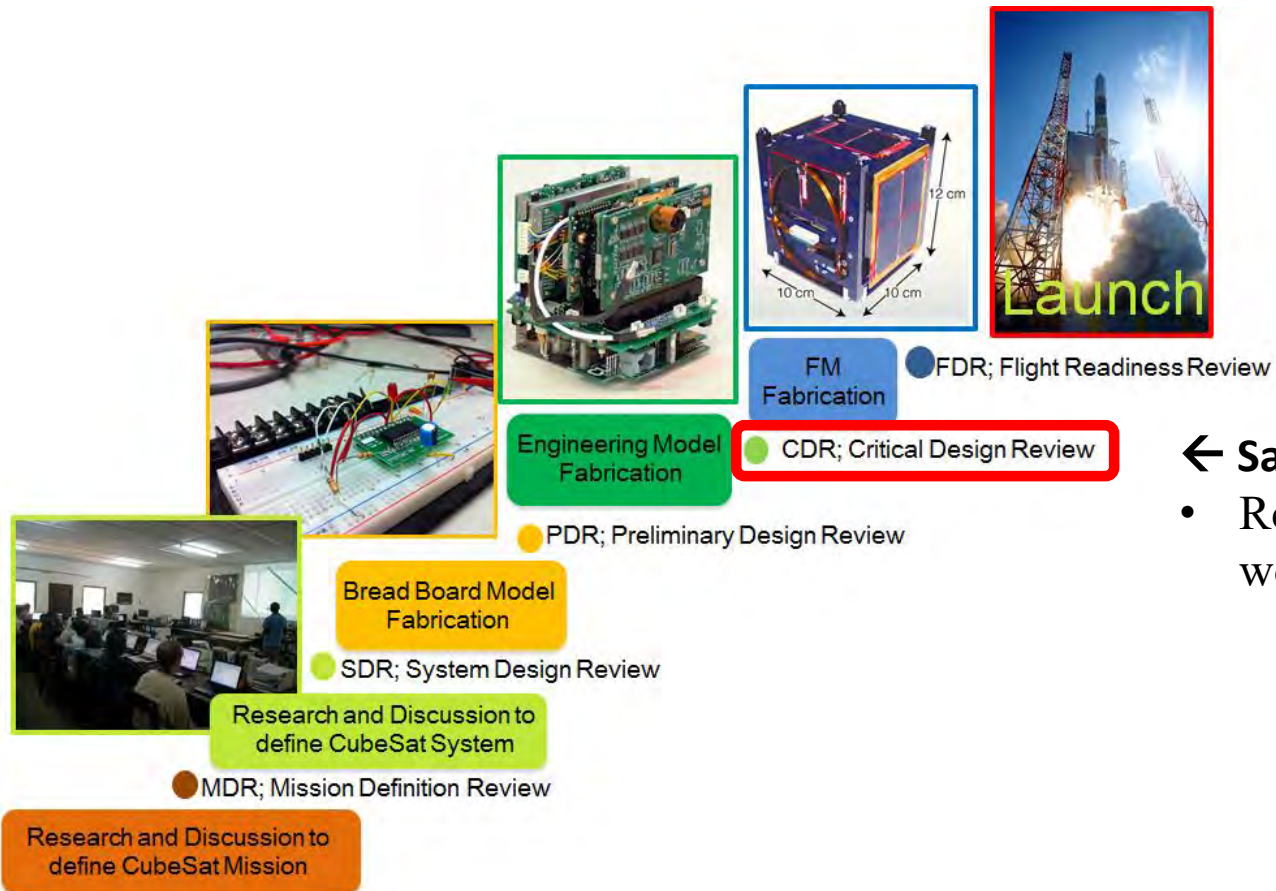
BIRDS 5 Critical Design Review (CDR)



By : Timothy Kudzanayi Kuhamba
Date 10 September 2021



BIRDS 5 CDR



← Satellite Critical Design Review

- Review the design hardware and software are working as expected

CDR Presentations program

❖ BIRDS-5 Overview

- Mission Statement
- Objectives
- Team Structure
- System Block Diagram
- CAD Design

❖ Missions Presentation

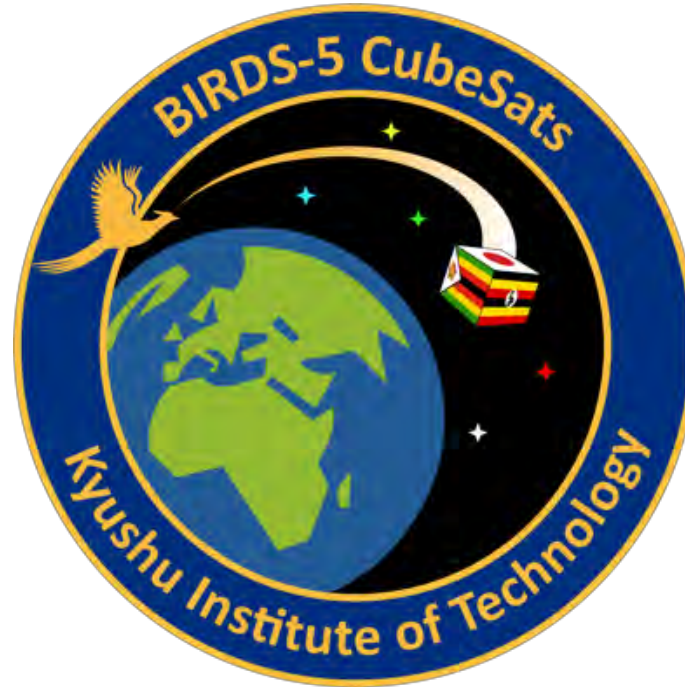
❖ Break (10 minutes break)

❖ Bus System Presentation

❖ Stakeholders Ground Station Update

❖ Concluding Remarks

Sponsors and Collaborators



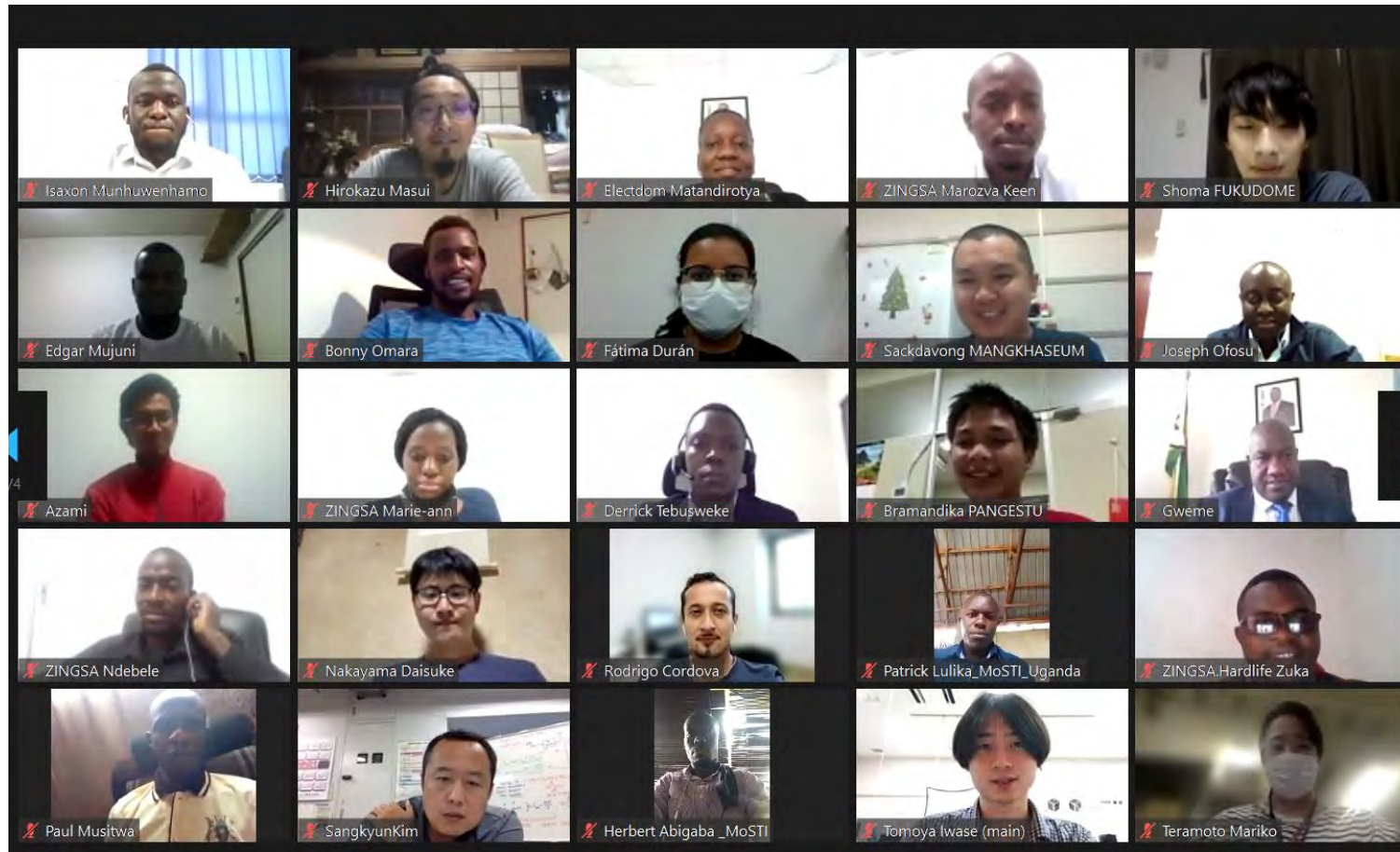
CDR Mission and Subsystem Presentations

- Attitude Visualization (ATT-VIS)
- Multispectral Camera (MULT-SPEC)
- Multi Spectral Image processing
- Image Classification (IMG-CLS)
- Double Langmuir Probe (DLP)
BIRDS-NEST
- Store and Forward/ APRS-Digipeating
- (Particle Instrument for Nano-satellite)
- Attitude Control System (ADCS)
- 1U Structure (1U-STR)

CDR Subsystem Presentations

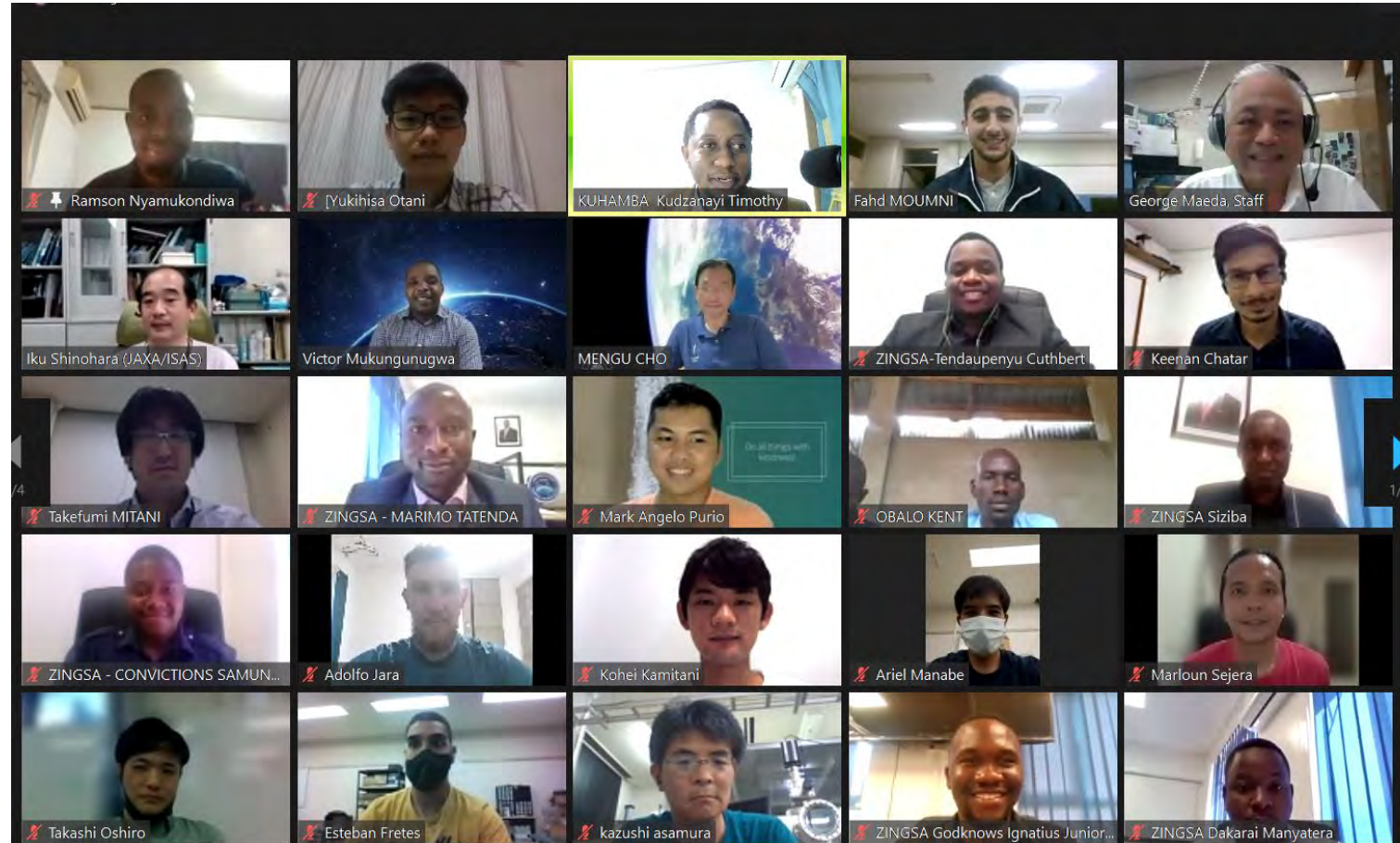
- 2U Structure (2U-STR)
- Thermal System for 1U and 2U
- Communication System (COMMS)
- Electrical Power System (EPS)
- Ground Station (GS)
- Antenna Deployment (ANT-DEP)
- *Stakeholder Updates and Concluding Remarks*

BIRDS 5 CDR ATTENDEES



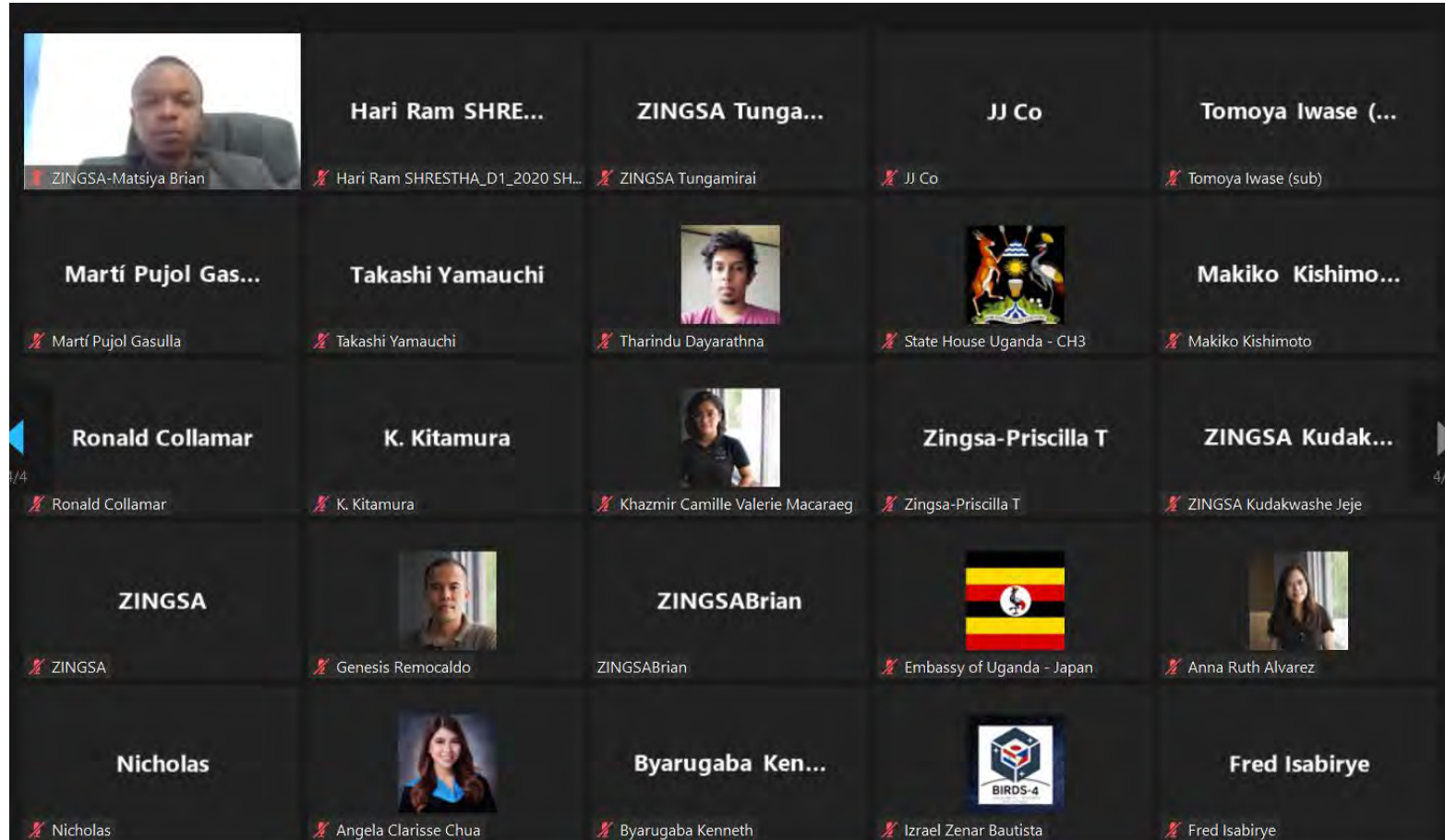
People who attended the CDR Meeting

BIRDS 5 CDR ATTENDEES



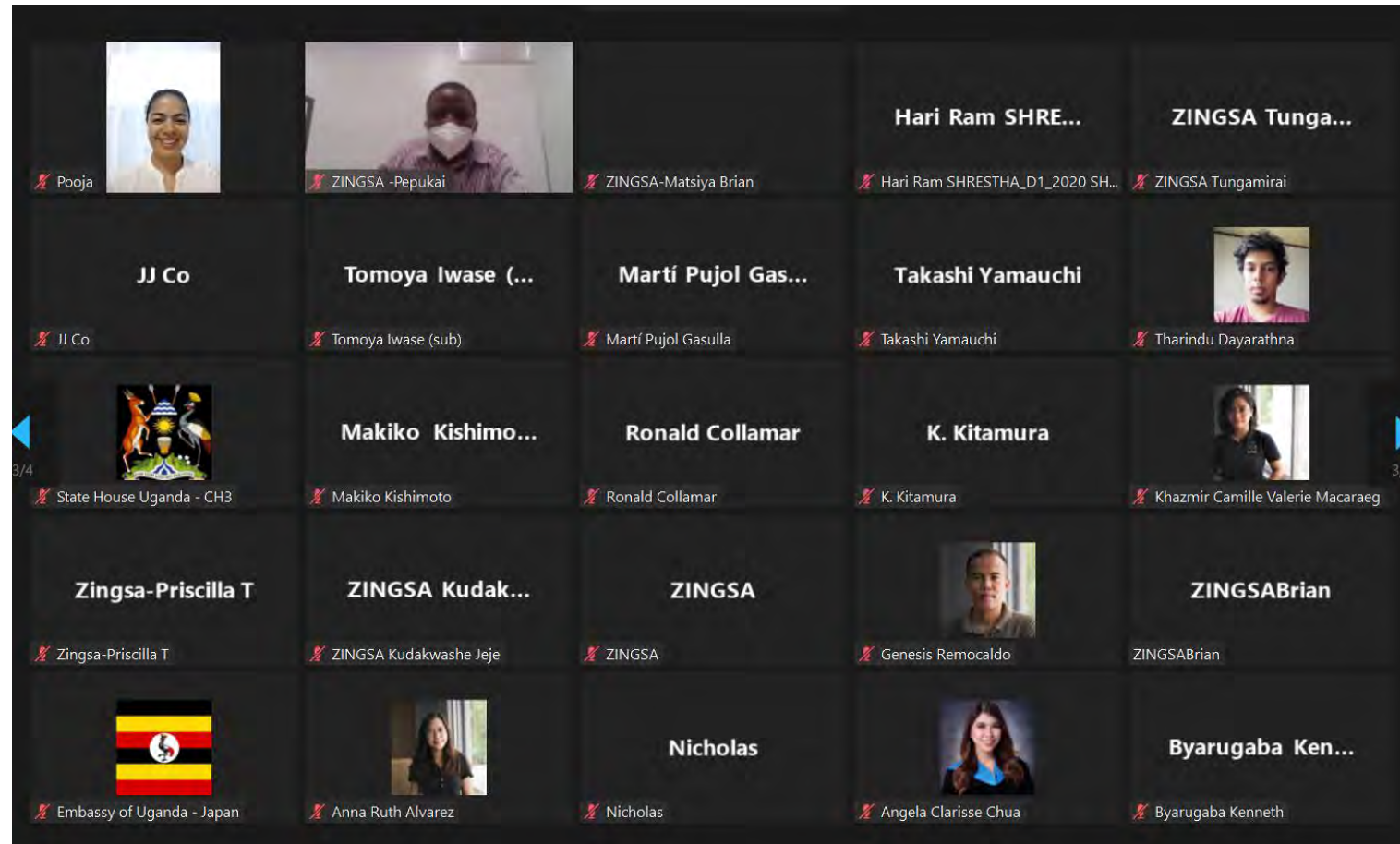
People who attended the CDR Meeting

BIRDS 5 CDR ATTENDEES



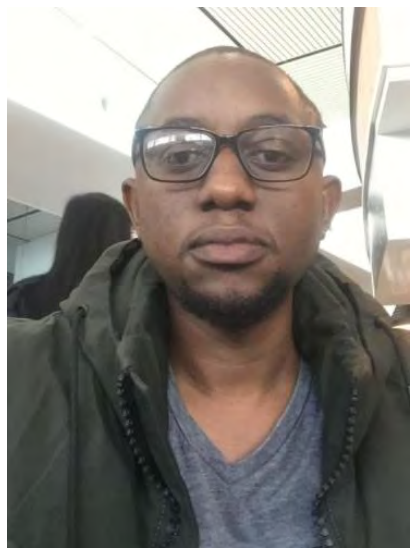
People who attended the CDR Meeting

BIRDS 5 CDR ATTENDEES

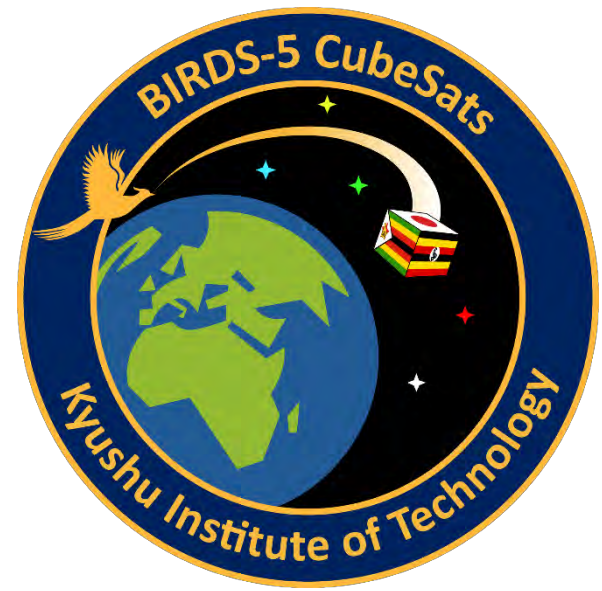


People who attended the CDR Meeting

Women in Space at Kyushu Institute of Technology



By : Timothy Kudzanayi Kuhamba
Date 6 September 2021



Women in Space at Kyutech

- This year celebrations they will a one-hour program focusing on :
- Woman Sharing their experiences in satellite development processes
- Staff sharing their experiences in the Space industry
- Words of encouragement to the Girls who want to join Kyutech
- Program will be premiered on SEIC YouTube during World Space week
- SEIC YouTube Channel



- https://www.youtube.com/channel/UC_XUgaOV30kyk59WYJeBBWg

Women in Space at Kyutech



Mariko Teramoto
Assistant Professor
Country: Japan



World Space Week Official 2021 Poster

Women in Space at Kyutech



TSUKINARI Sayo
Secretary to Professor Cho Lab
Country: Japan



SHIRAKAWA Kumiko
Secretary to Professor Cho Lab
Country: Japan

Women in Space at Kyutech



Pooja Lepcha
PhD Student
Country: Bhutan



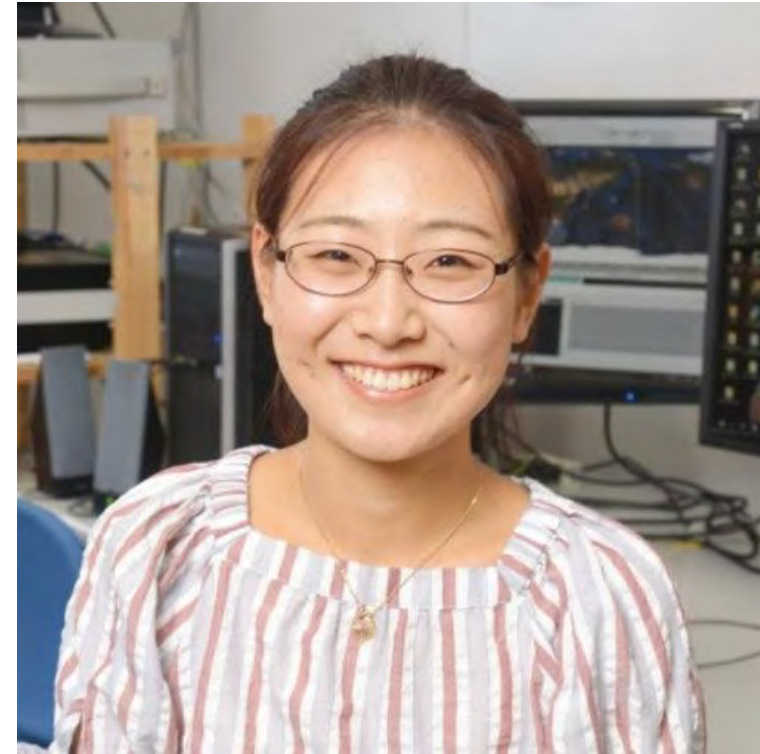
Dulani Chamika
PhD Student
Country: Sri Lanka



Women in Space at Kyutech



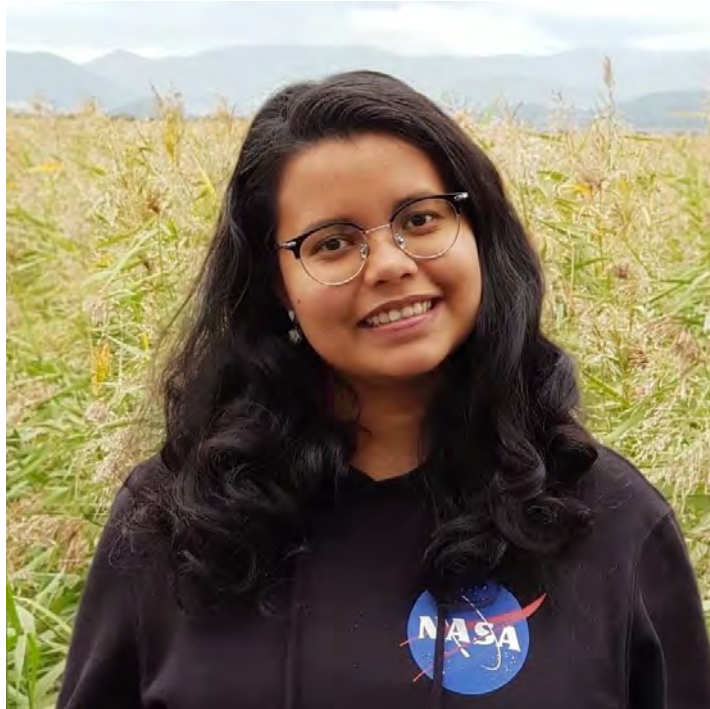
Aekjira KUYKANONT
PhD Student
Nationality: Thailand



KISHIMOTO Makiko
PhD Student
Country: Japan



Women in Space at Kyutech



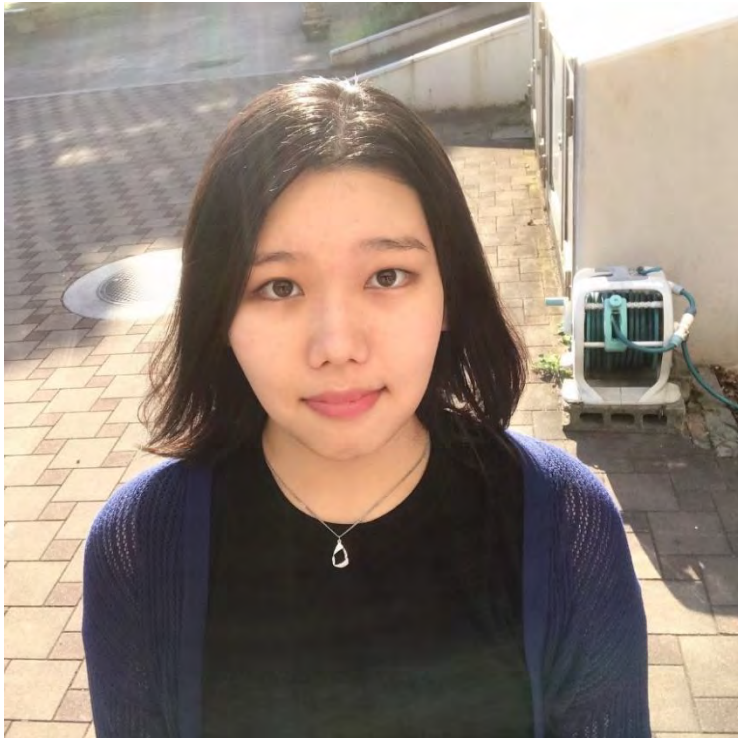
Fatima Gabriela DURAN DOMINGUEZ
Master Student
Nationality: El Salvador



CHIKUSA Ayumi
Bachelor Student
Nationality: Japan



Women in Space at Kyutech



Ogi Ayaka
Bachelor Student
Nationality: Japan



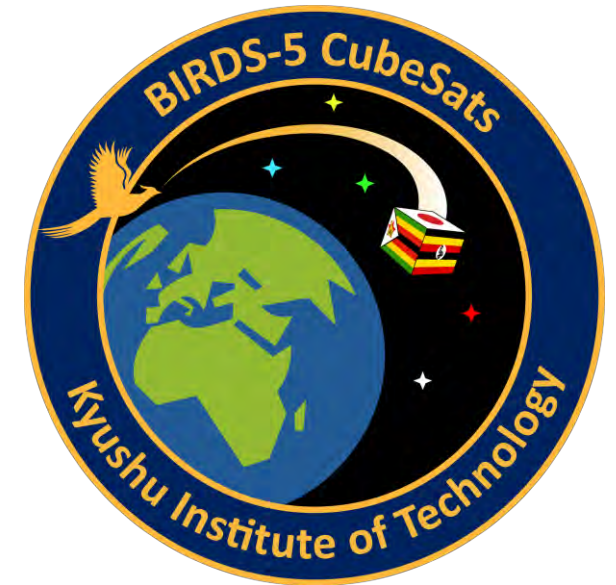
Yoshimura Sayaka
Bachelor Student
Nationality: Japan



BIRDS-NEST Phone Application



By : Fahd MOUMNI
17 September 2021



What is it?

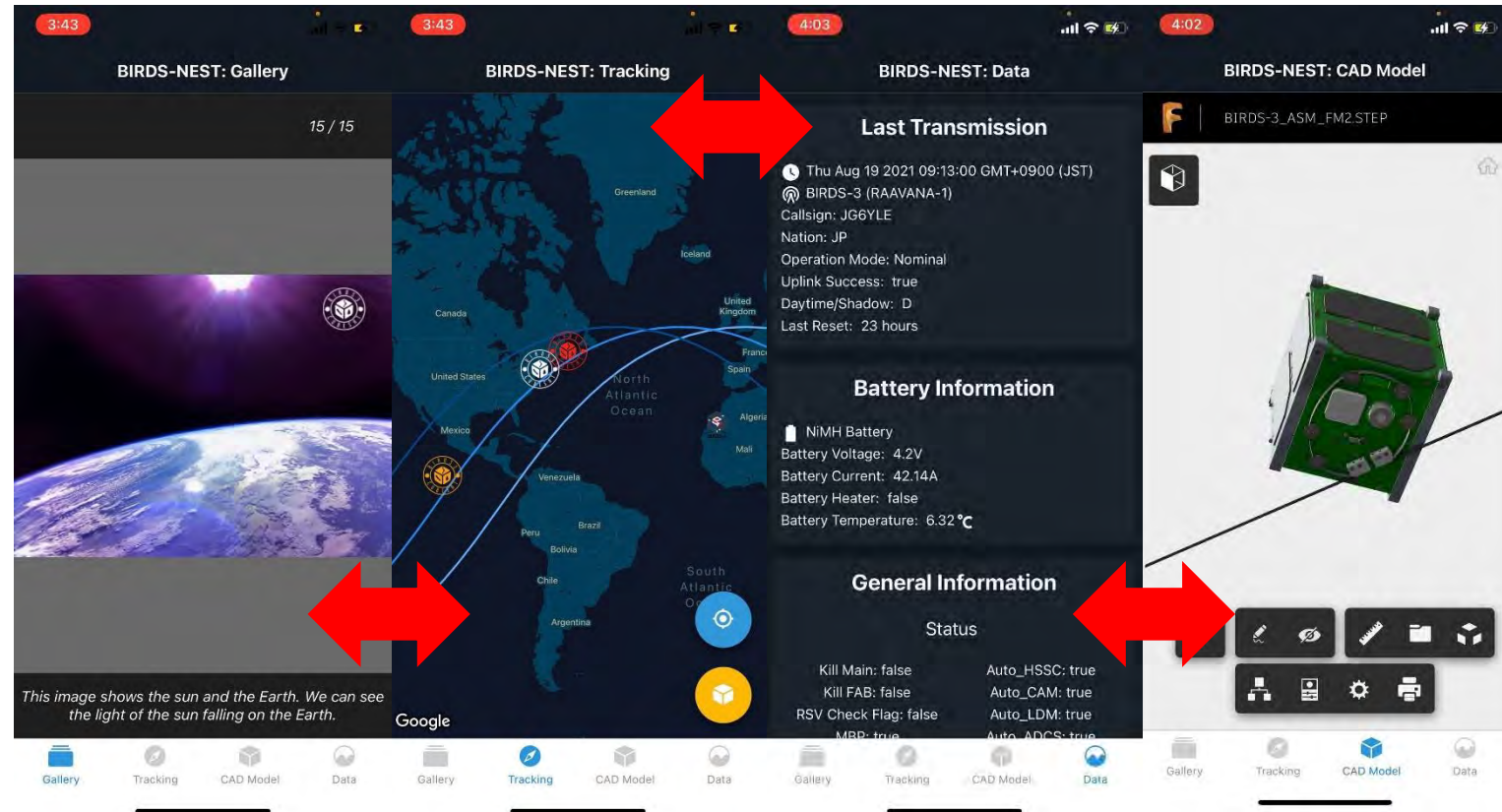
- BIRDS-NEST (BIRDS-Network of Educational SaTellites) is the official BIRDS satellites application !!
- BIRDS-NEST centralizes BIRDS satellites data, gathered from the Ground Stations, in a cloud database to showcase it on your smartphone !
- The application was made to let everyone feel closer to space and understand more what happens over there.
- With BIRDS-NEST, stakeholders of the BIRDS Projects can clearly visualize their investment between their hands !



BIRDS-NEST Logo

How does it work ?

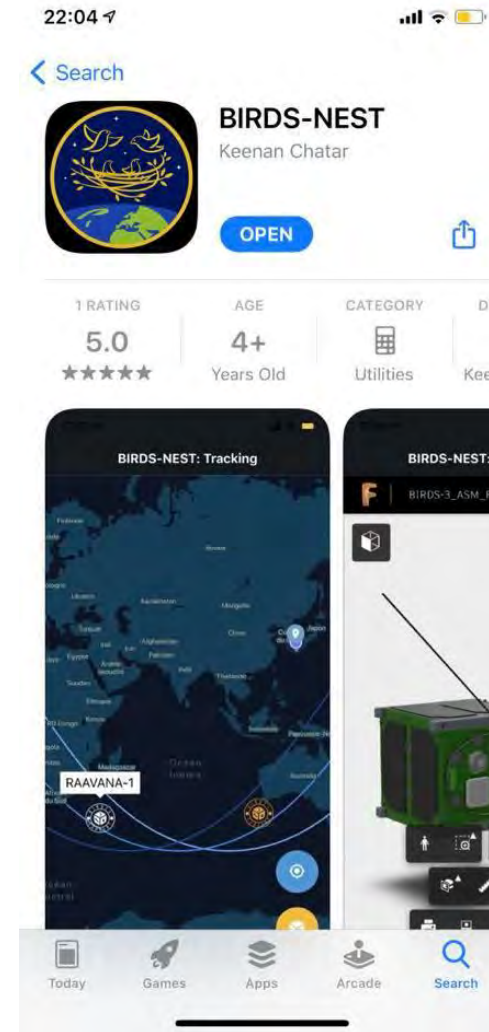
- Four tabs are accessible :
 1. The first one shows photos taken by the satellite camera(s).
 2. The second tab tracks the orbit trajectory of the payloads around Earth.
 3. The CAD model can be freely observed and examined either externally or internally.
 4. Data coming from the last transmission can be read on the last tab. The information is related to the health and status of the CubeSats.



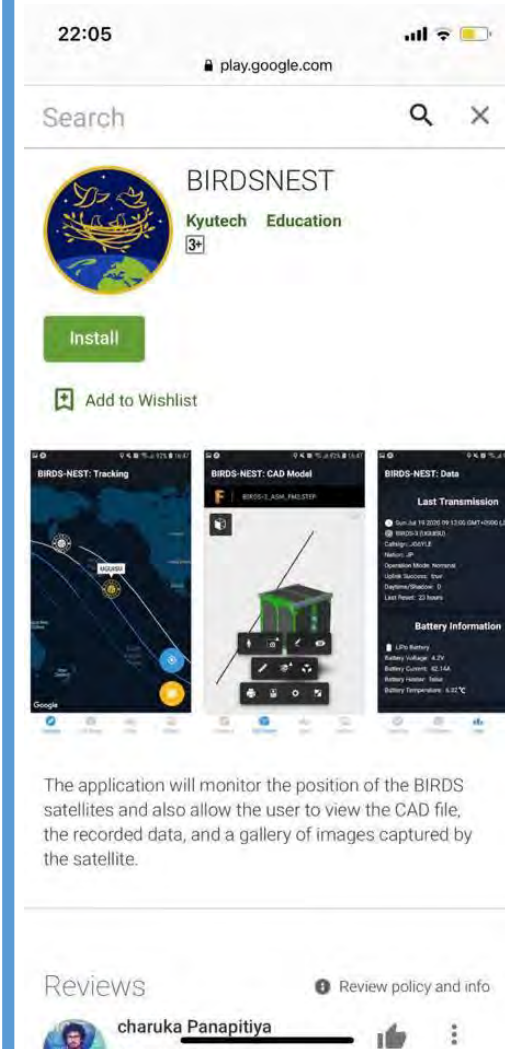
User Screens

Where to get it from?

- The application is accessible in both Appstore and Playstore platforms for free !!
- The link for Appstore is: <https://apps.apple.com/jp/app/birds-nest/id1535373770?l=en>
- The link for Playstore is : <https://play.google.com/store/apps/details?id=com.kyutech.birdsnestproject&hl=en>
- The application is already used in 23 countries ! (4 continents)



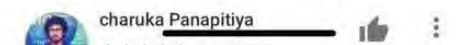
Appstore Preview



Playstore Preview

The application will monitor the position of the BIRDS satellites and also allow the user to view the CAD file, the recorded data, and a gallery of images captured by the satellite.

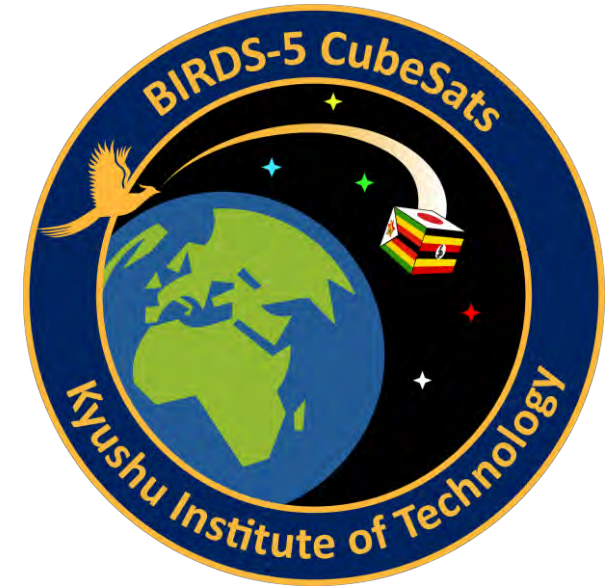
Reviews Review policy and info



Facebook Ads to promote BIRDS-5



By : Fahd MOUMNI
17 September 2021



The idea

- Making BIRDS Projects famous and achieving the outreach effort can be a bit difficult if we don't know where to start with.
- BIRDS Projects already have a notoriety in the Space Field, but what about the rest of the world ? Space is becoming the main topic with all the recent revolutionary achievements, many people pay a lot more attention to it.
- Social Media became also the most preferred way for many digital marketers to promote ideas or vehicle messages to the public.
- The idea of Facebook Ads to promote the BIRDS-5 Project came to us



Facebook Ads logo

<https://www.davidmocerri.com/5-facebook-ads-hack-strategize-campaign/>

The process

- Injecting some money in the social media helps “boosting” the page, a particular post or even a weblink.
- The only need is to connect a credit card to a Facebook account, administrator of the page to promote.
- The countries audience can be chosen, which helps target non-space faring countries better, especially if the youth of those countries is reached.



The target audience deeply affects the boosting results

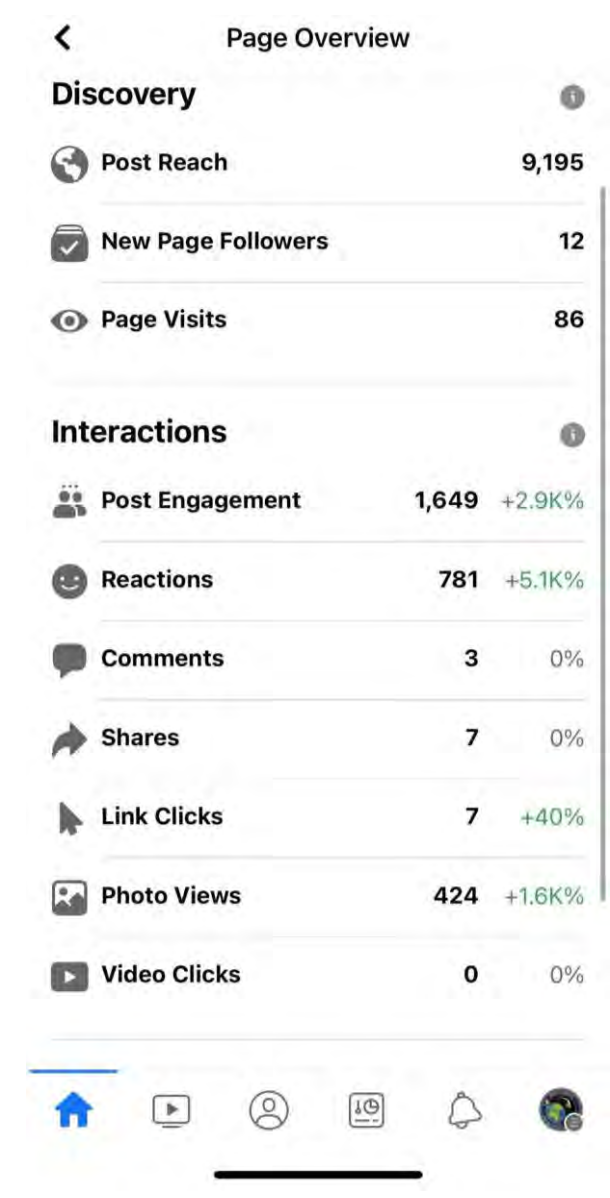
<https://www.findyello.com/tip/belize/stop-losing-money-learn-to-how-to-reach-the-right-target-audience/>

The results (1/2)

- For 6,892 yen, already 128,925 people were reached.
- We have 2292 followers on Facebook and 46 on Instagram (they can be connected for better management)
- The main users are between 18-24 years old (71.5 % Men, 28.5 % Women)
- We are receiving messages from people to participate in the BIRDS-5 Project



Account Overview



Page Overview

The results (2/2)



Audience



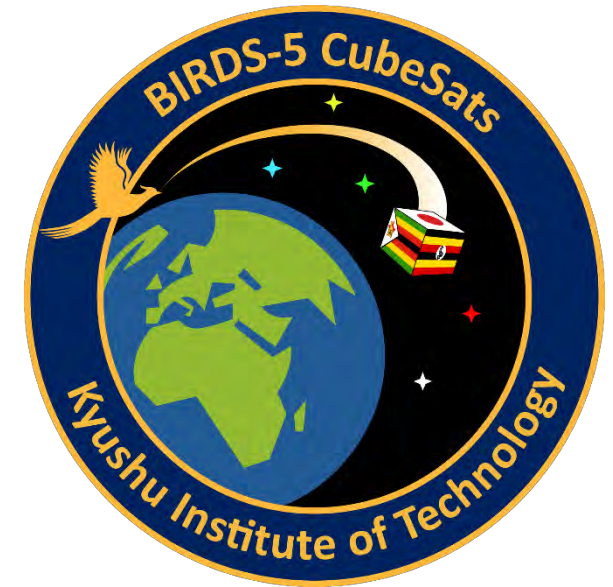
Some comments

Image Classification Mission (IMG-CLS)



By: Keenan Chatar

14/09/2021



Introduction

- Mission Statement:
 - The customer requires the satellite to capture multiple high-quality RGB (color) images of the member countries (Japan, Uganda and Zimbabwe) from space and classify the images based on the image contents
- End Users:
 1. Developers
 2. Government stakeholders
 3. General Public
 4. Education departments

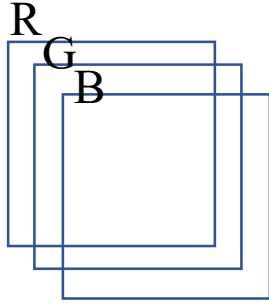


Image Classification and Segmentation

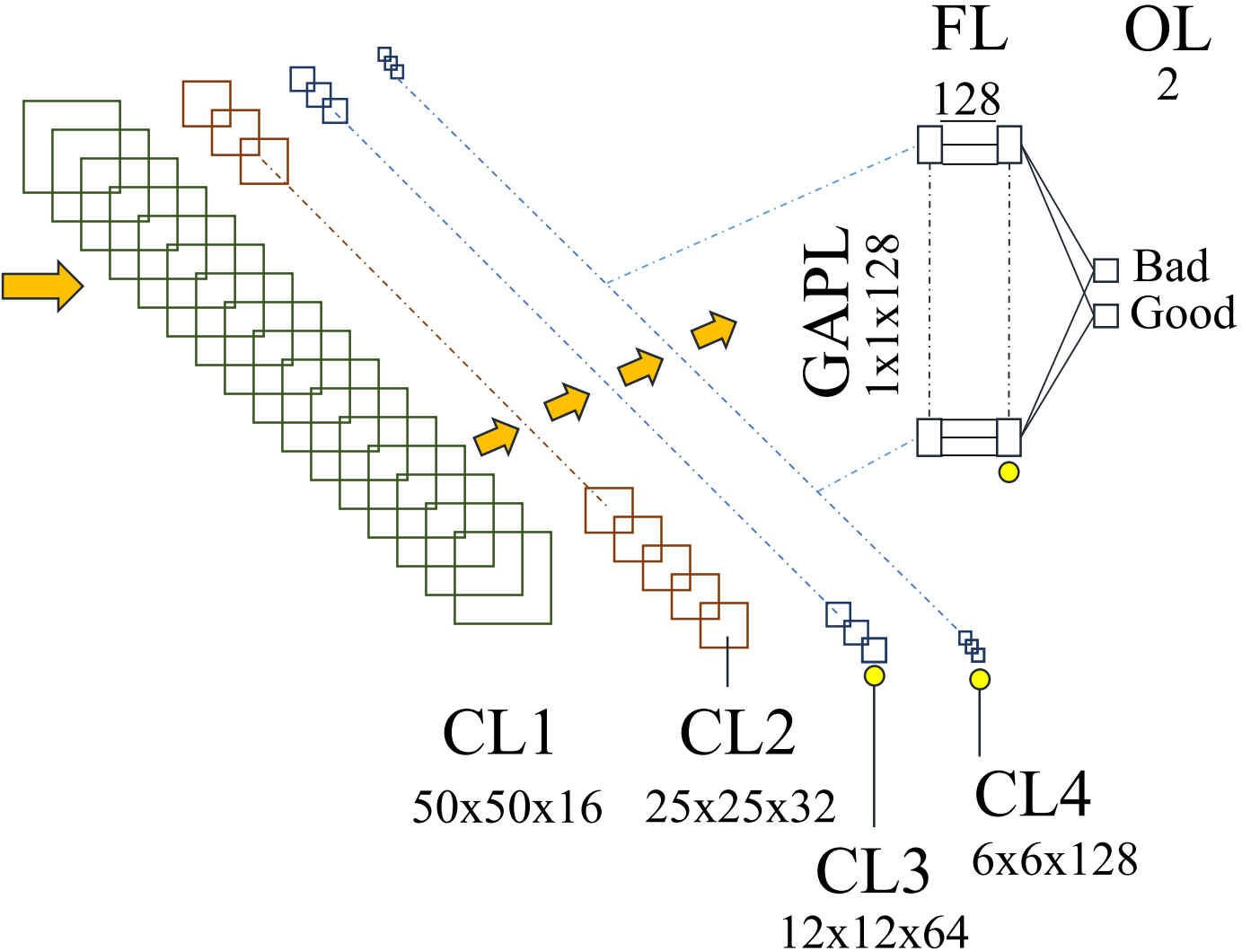
Source: http://www.landinfo.com/classification_object-based-image-analysis.htm

Neural Network Architecture

- Convolutional Neural Network
 - Simple
 - 8-layer Architecture

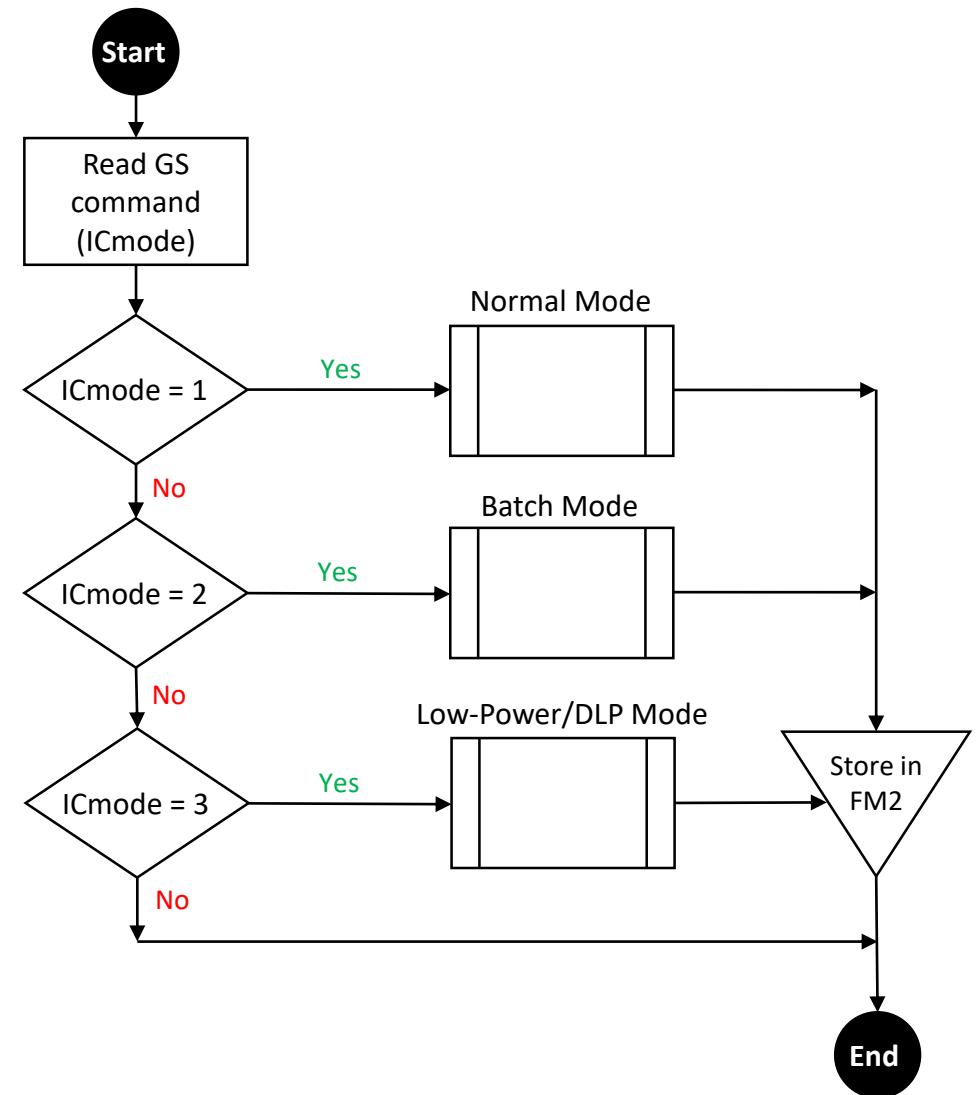


Layer	Short	Specifics
Input	-	100x100x3
Convolution I	CL1	50x50x16
Convolution II	CL2	25x25x32
Convolution III	CL3	12x12x64
Convolution IV	CL4	6x6x128
Global Avg. Pooling	GAPL	1x1x128
Flattening Layer	FL	128
Output Layer	OL	2



Mission Modes

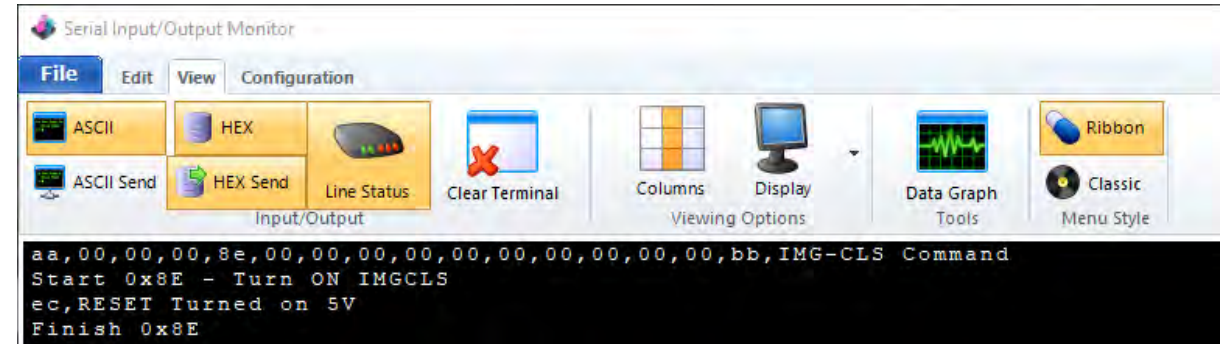
- Three Primary Modes:
 - Normal Mode – Capture image, classify contents, store to memory
 - Batch Mode - Capture a series of images, classify contents, store to memory
 - Low Power/DLP Mode – Turn off camera, allow DLP to perform tasks, store data to memory



Mission Mode Execution

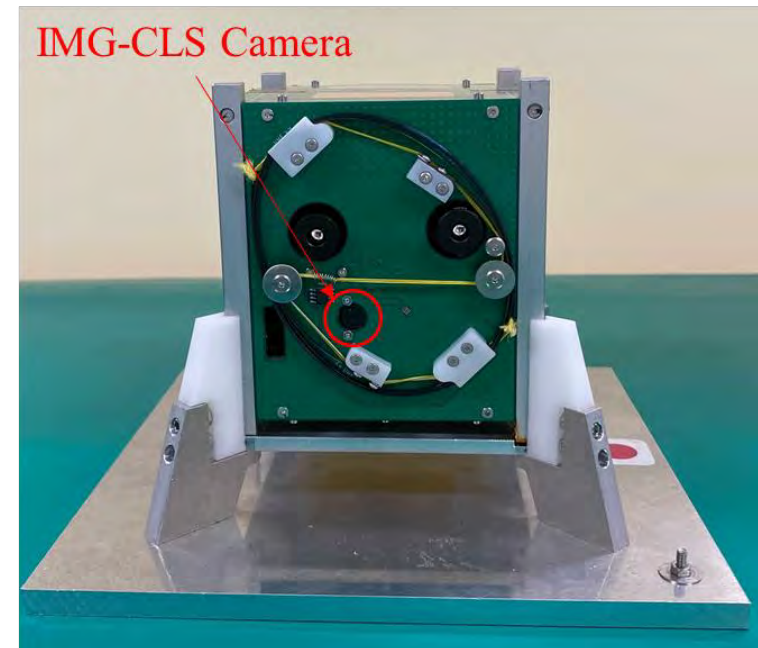
- **Uplink IC ON Command from GS:**

- Received by COMM
- Forwarded to MAIN
- Forwarded and executed by MB
- Turns on IMG-CLS (D I/O)
- Three minutes to boot (3 mins)



- **Uplink Capture Command from GS:**

- Received by COMM
- Forwarded to MAIN
- Forwarded to MB
- Forwarded to IMG-CLS (UART)
- IMG-CLS reads command and executes



Mission Mode Execution

- 1) Mission start and Mission Boss handshake
- 2) Image capture and classification
- 3) Captured data saved to Shared FM2 (SPI)
- 4) Mission complete and Pi shutdown (D I/O)

```
pi@raspberrypi-IMCL: ~  
File Edit Tabs Help  
(venv) pi@raspberrypi-IMCL:~$ python MissionMode1.py  
2021-04-05 20:08:04.435924: E tensorflow/core/platform/hadoop/hadoop_file_system.cc:132] HadoopFileSystem  
load error: libhdfs.so: cannot open shared object file: No such file or directory  
23.90075570678711  
Received:0XB'48'  
Handshake Success  
  
Received:0XB'48'  
Handshake Success  
  
Received:0XB'49'  
Mission Mode 1 Start  
  
== Input Details ==  
name: x  
shape: [ 1 100 100 3]  
type: <class 'numpy.float32'>  
  
== Output Details ==  
name: Identity  
shape: [1 2]  
type: <class 'numpy.float32'>  
/usr/lib/python3/dist-packages/picamera/encoders.py:521: PiCameraAlphaStripping: using alpha-stripping to  
convert to non-alpha format; you may find the equivalent alpha format faster  
"using alpha-stripping to convert to non-alpha "  
/usr/lib/python3/dist-packages/picamera/encoders.py:544: PiCameraResolutionRounded: frame size rounded up  
from 100x100 to 128x112  
width, height, fwidth, fheight)))  
Result of Classification: [[1. 0.]]  
Mission Mode 1 End
```

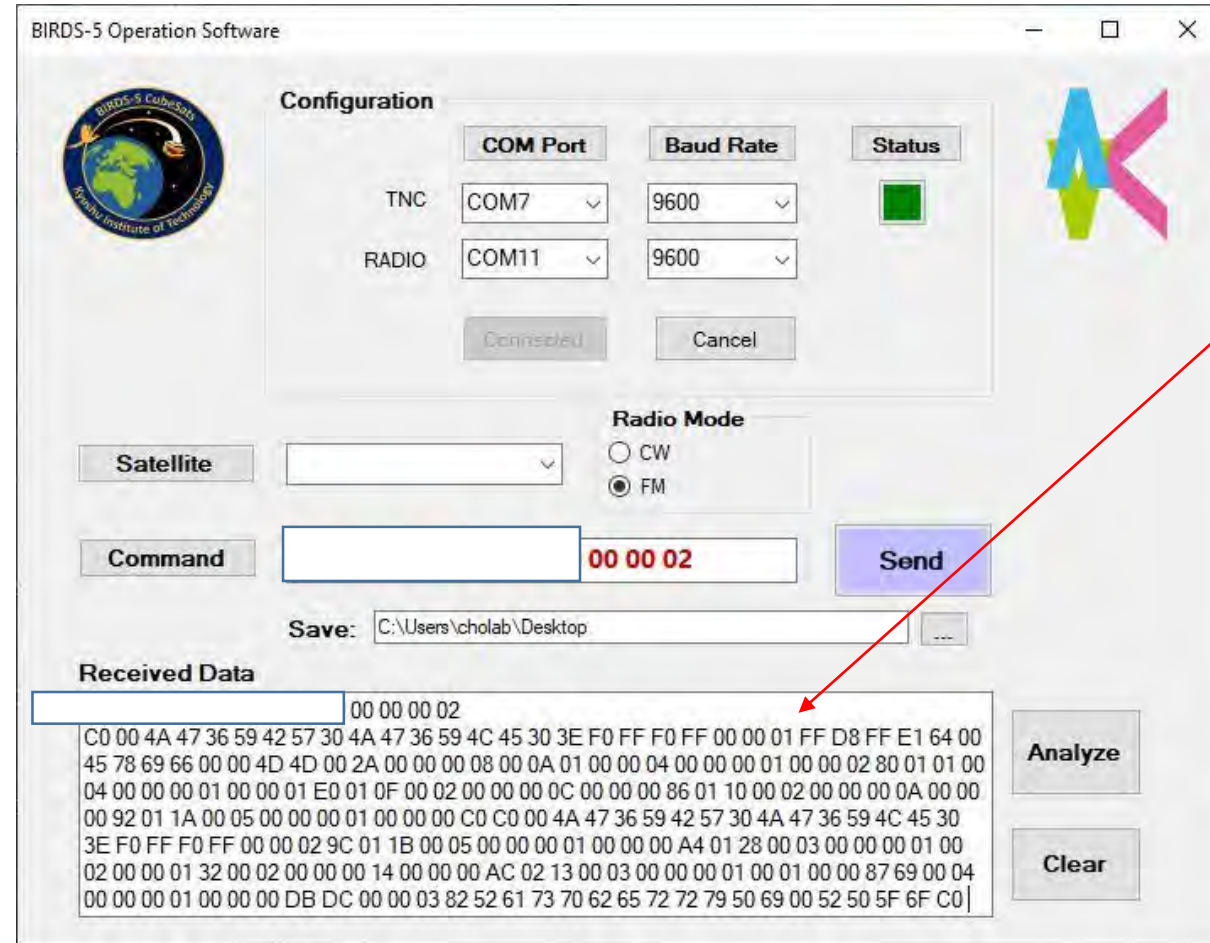
1. Handshake successful
2. Mission Mode 1 start successful
3. Capture successful
4. Classification successful

```
Writing to page 2 and 235  
Writing to page 2 and 236  
Writing to page 2 and 237  
Writing to page 2 and 238  
Writing to page 2 and 239  
Writing to page 2 and 240  
Successfully wrote the data to Flash memory. ▶ 5. Write successful  
  
FF D8 FF E1 64 00 45 78 69 66 00 00 4D 4D 00 2A  
00 00 00 08 00 0A 01 00 00 04 00 00 00 01 00 00  
02 80 01 01 00 04 00 00 00 01 00 00 01 E0 01 0F  
00 02 00 00 00 0C 00 00 00 86 01 10 00 02 00 00  
00 0A 00 00 00 92 01 1A 00 05 00 00 00 01 00 00  
00 9C 01 1B 00 05 00 00 00 01 00 00 00 A4 01 28  
00 03 00 00 00 01 00 02 00 00 01 32 00 02 00 00  
00 14 00 00 00 AC 02 13 00 03 00 00 00 01 00 01  
00 00 87 69 00 04 00 00 00 01 00 00 00 C0 00 00  
03 82 52 61 73 70 62 65 72 72 79 50 69 00 52 50  
5F 6F 76 35 36 34 37 00 00 00 00 48 00 00 00 01  
00 00 00 48 00 00 00 01 32 30 32 31 3A 30 34 3A  
33 30 20 31 35 3A 31 36 3A 30 31 00 00 17 82 9A  
00 05 00 00 00 01 00 00 01 DA 82 9D 00 05 00 00  
00 01 00 00 01 E2 88 22 00 03 00 00 00 01 00 03  
00 00 88 27 00 03 00 00 00 01 00 64 00 00 90 00  
  
[32, 186, 33, 16, 68, 0, 4, 44, 148, 0, 11, 9, 0, 9, 0, 224, 180, 105, 228, 24]  
(venv) pi@raspberrypi-IMCL:~$
```

- ▶ 5. Write successful

Mission Mode Execution

- Downlink Image to GS
 - Received and executed by COMM



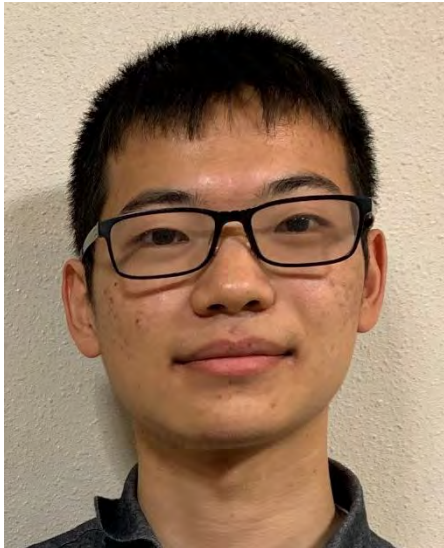
FF D8 FF E1...



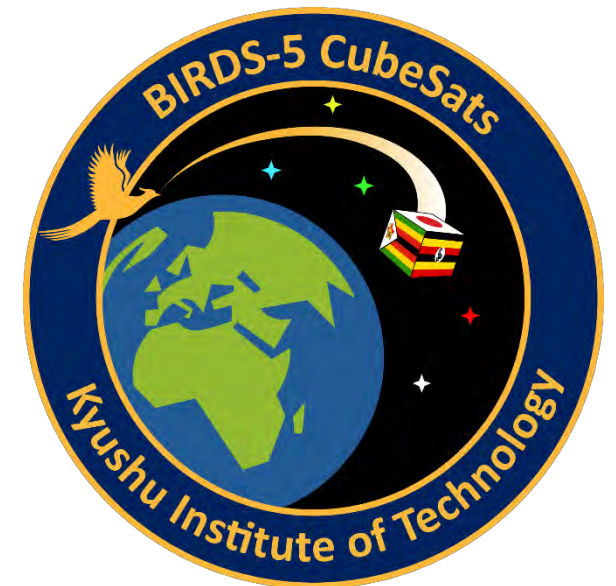
[1, 0]
[Good, Bad]

END OF THIS SECTION

On-Board Computer (OBC)

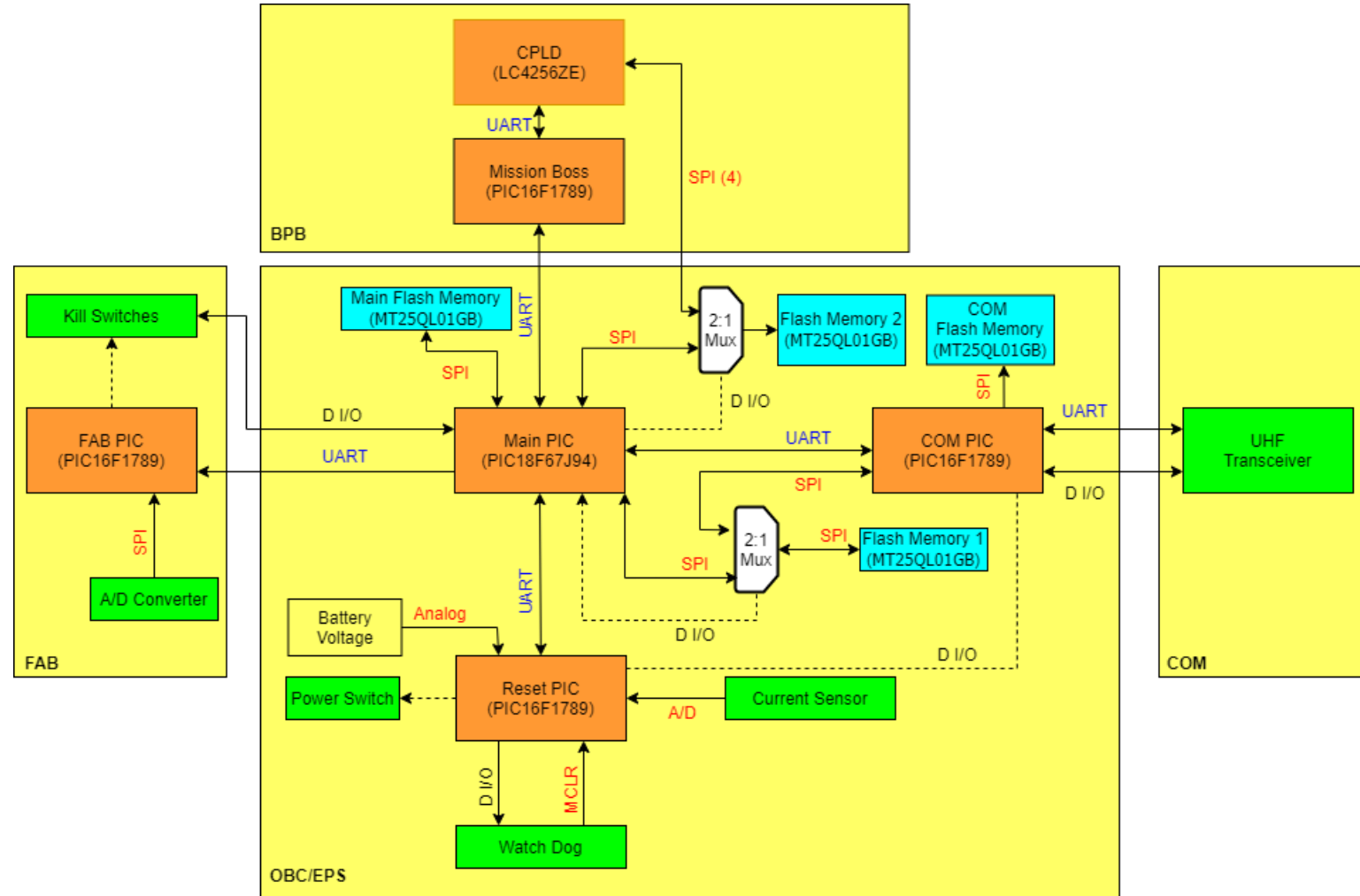


By : Yukihiisa Otani
4 September 2021

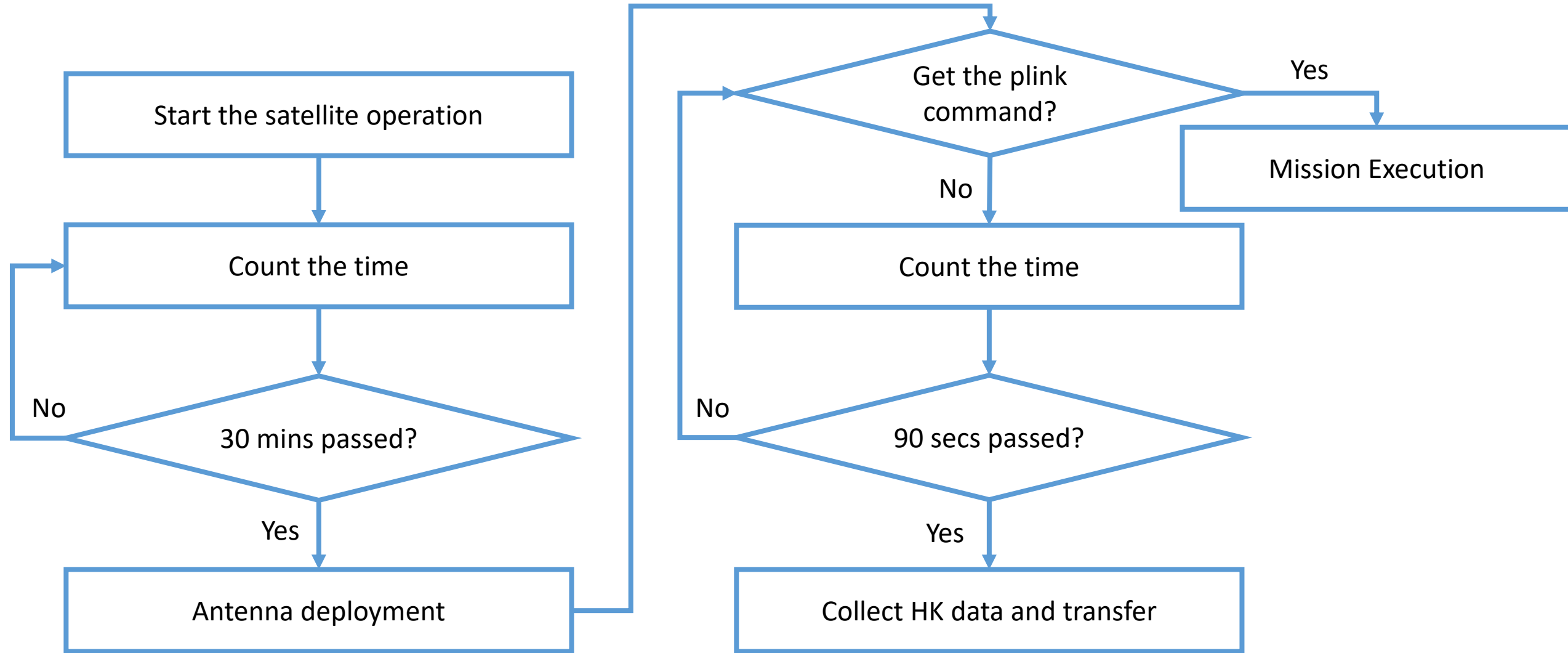


OBC Diagram

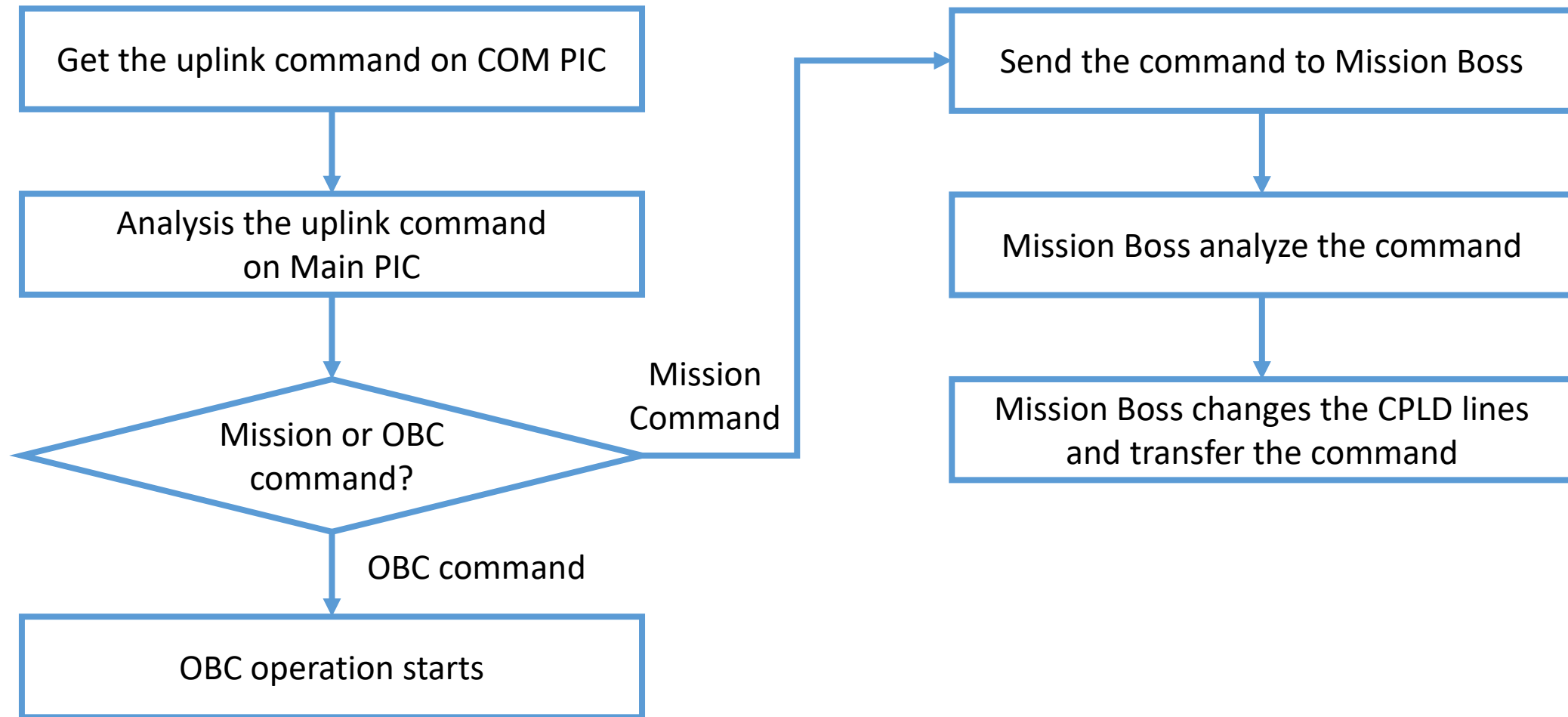
- OBC board is consisted of three MCU and three Flash Memory.
- Main PIC analyzes and transfers the command and store the HK and mission data.
- Reset PIC handles the power line and counts the time for 24h reset.
- COM PIC creates the CW data, receives the uplink command, and send the downlink data to the transceiver.



OBC general operation



Mission Execution operation



OBC-Mission integration test

	Turn on and off the power switch (D I/O)	Command Transfer (UART)	Data Storing (SPI)	Handle the trigger (D I/O)
Multi Spectral Camera	○	○	○	○
Image Classification DLP	○	○	○	-
APRS Store & Forward	○	○	○	-
ADCS	○	○	○	-
PINO	○	○	×	○

OBC RAS

System Requirement	Result	Details
Send the CW data	△	CW sending has not been tested yet
Send the FM data	○	Got the mission data
Analyze the Uplink command	○	Executed the command
Send the command to Mission	○	Mission got the command and worked
Monitor the satellite situation	△	24h monitoring has not been tested yet

○ : Complete, △ : Not Complete, × : Failed

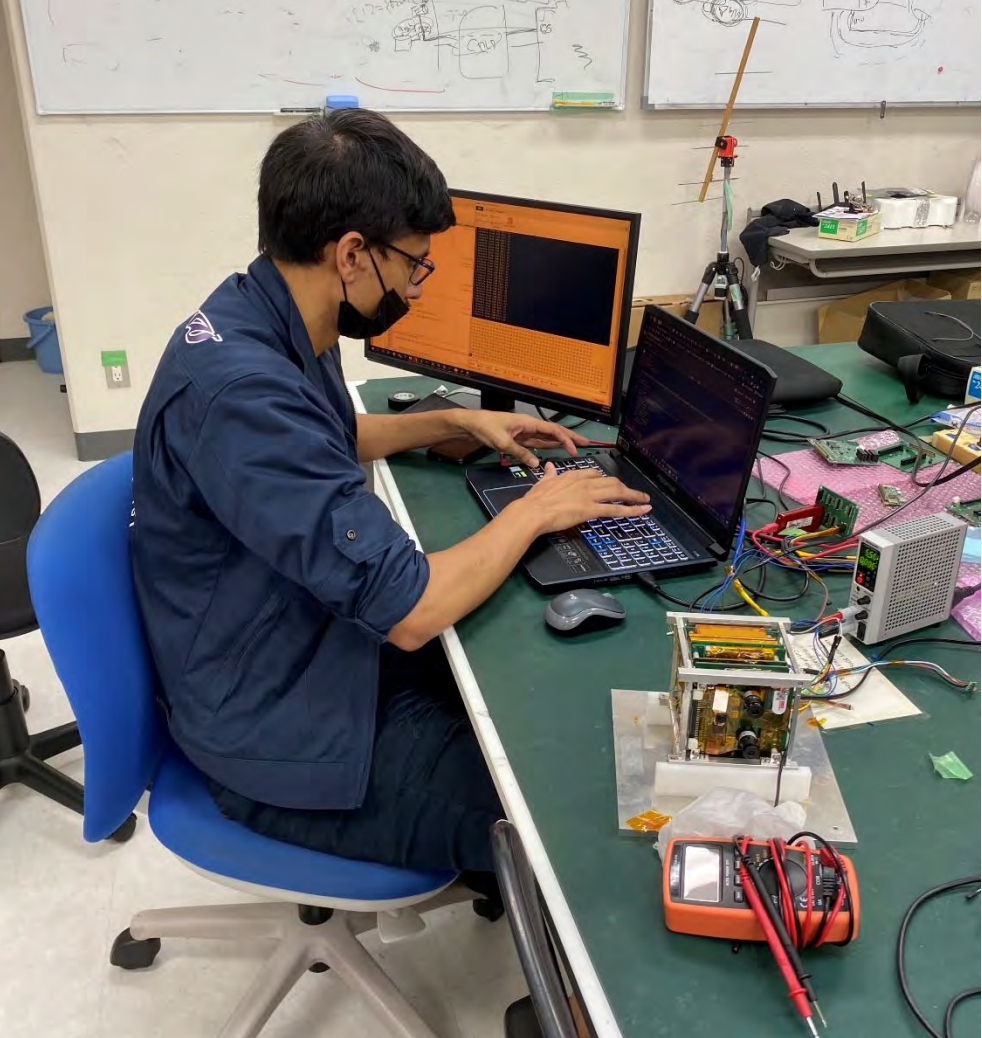
The importance of OBC

- Must store the HK (house keeping) data
 - It is only way for us to understand the satellite situation.
- Must execute the command operation
 - Unpredicted working leads the satellite failure.
- Must count the timer
 - 30mins to antenna deployment are one requirement from JAXA
 - If the CW cannot be sent to the GS, we would estimate that the satellite is dead.

OBC activity photos



```
Start Operating  
Ant Dep Attempt No: 04  
COMMAND RECEIVED FROM PC: 4e0000000000000000  
ADCS Command  
Start 0x4E - Turn ON ADCS  
Data Recieved from MBP:4e,00,00,00,00,00,00,00,00,00,  
Finish 0x4E  
COMMAND RECEIVED FROM PC: 42aa0000000000000000  
ADCS Command  
Start 0x42 - Real time Downlink ADCS  
Data Recieved from MBP:42,aa,00,00,00,00,00,00,00,00,  
Data Recieved: 5562a9118dfe9a0009fedc0062ff  
Finish 0x42  
COMMAND RECEIVED FROM PC: 40000000000000000000  
ADCS Command  
Start 0x40 - Turn OFF ADCS  
Data Recieved from MBP:40,00,00,00,00,00,00,00,00,00,  
Finish 0x40
```



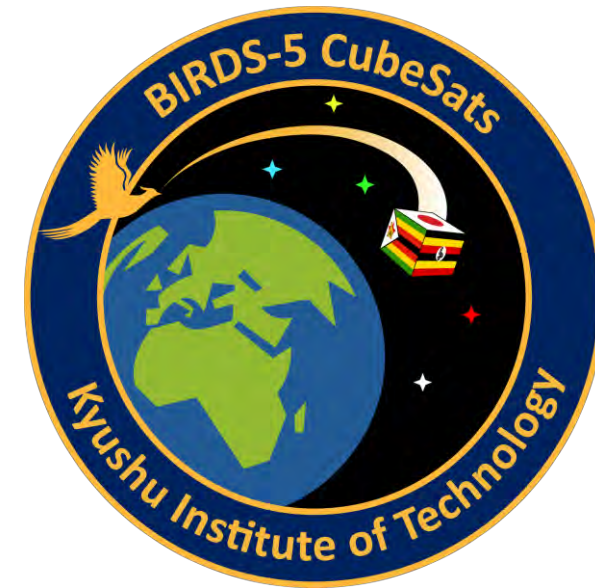
END OF THIS SECTION

Space System Book Seminars



By: Edgar Mujuni

11th September 2021



Space System Book Seminars

Every SEIC student at Kyutech is obligated to attend as well as make scheduled presentations during SEIC book seminars, where a special Space Engineering textbook is divided into different sections of chapters and distributed to students to read, fully understand the context and make a detailed presentation in a stipulated amount of time (usually 20/40min).

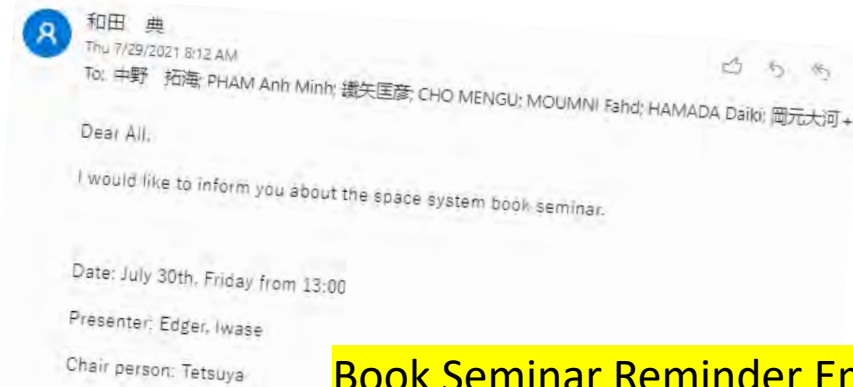
Chapter	Contents
3	Space Mission Engineering
4	Mission Concept Definition and Exploration
5	Mission Analysis and Mission Utility
6	Formal Requirements Definition(~6.2)
13	Reducing Space Mission Cost and Schedule
23	Space Logistics and Manufacturing
24	Risk and Reliability
25	Alternative Spacecraft Designs (25.3~)
26	Launch Vehicles

Book Seminar Chapters

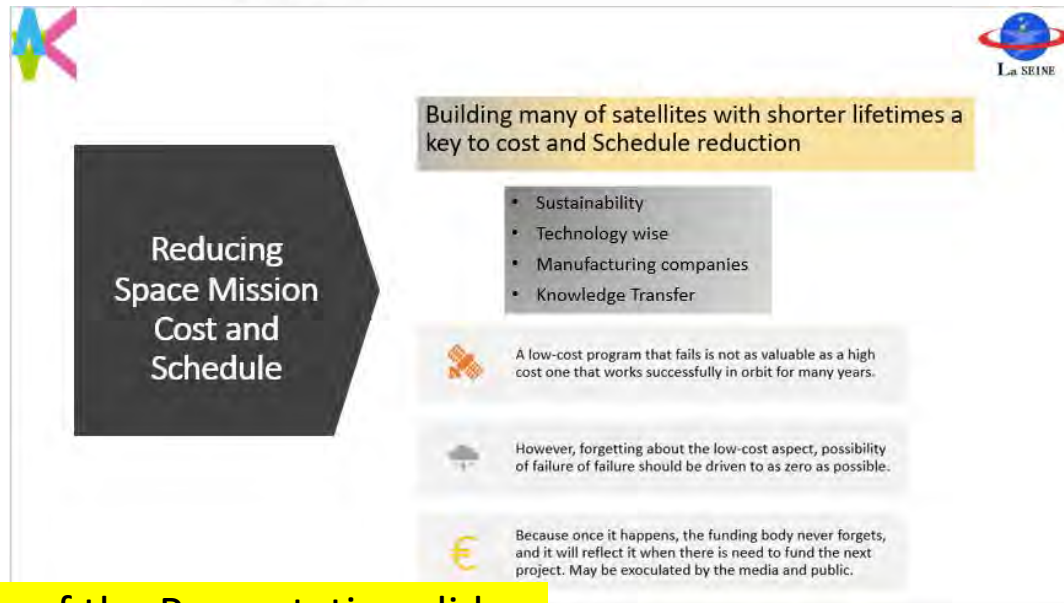
Page from	Page to	number of pages	Presenter	No.	Date (plans)	Chairperson
45	52	7.5	Okamoto	1		
52	59	7	Hamada	2	6/11/2021	Wada
61	66	6	Fahd	3		
66	74	7	Okamoto	4	6/18/2021	Nakano
74	82	8.5	Fahd	5		
83	90	7.5	Hamada	6	7/2/2021	Okamoto
90	97	7.25	Minh Pham	7		
97	103	5.75	Nakano	8	7/9/2021	Fahd
105	112	8	Minh Pham	9		
355	362	7	Tetsuya	10	7/16/2021	Hamada
362	368	6.5	Edgar	11		
368	375	6.5	Iwase	12	7/30/2021	Tetsuya
Summer Vacation						
375	381	5.5	shinozaki	13		
381	388	7.75	Fatima	14	9/17/2021	Minh Pham
388	395	6.5	Fatima	15		
701	708	7	Fukudome	16	9/24/2021	Bonny
708	714	6	Nakano	17		
714	720	6	Wada	18	10/1/2021	Derrick
720	726	6	Nishinaga	19		
726	733	6.75	Bonny	20	10/8/2021	Fatima
733	739	6.25	Sawa	21		
739	744	5	Shiraishi	22	10/15/2021	Ariel
744	750	6	Derrick	23		
753	757	4.5	Tetsuya	24	10/22/2021	Edgar
757	764	6.5	Sawa	25		
764	771	7	Wada	26	10/29/2021	Fukudome
772	779	8	Shiraishi	27		
791	799	8	Ariel	28	11/5/2021	Sawa
799	806	6.25	Ariel	29		
806	813	7	Nishinaga	30	11/12/2021	Shinozaki
813	821	8.5	Derrick	31		
821	827	5.75	Bonny	32	11/26/2021	Nishinaga
829	834	6.25	Shinozaki	33		
834	840	5.75	Fukudome	34	12/10/2021	Iwase
840	847	7.5	Edgar	35		
847	854	6.5	Iwase	36	12/17/2021	Shinozaki

Seminar Schedule 1

Space System Book Seminars



Book Seminar Reminder Email



One of the Presentation slides

The chapters in these books are selected appropriately in relation to real life space engineering based on experiences acquired in past global space mission projects. This helps students not only to understand the technical aspect of space engineering but also the real-life applications, challenges and experiences that authors exploit in these chapters.

After each presentation, moderator opens the floor for questions and comments from the students and Senseis in attendance

This moderator is always a student as per his/her schedule.

Space System Book Seminars

These book seminars give students highlights about factors to consider during decision making with relevant examples as far as space missions are concerned. It also gives us an idea of what people out there expect from space technology versus what it can actually offer.

4.2 Defining Alternative Mission Concepts (Step 6)- How the Pieces Work Together

- Mission Concept = how the mission works
- Example : how to get data to satisfy the end-user
- It consists of four elements shown next (mostly related to data)
- Defining Mission Concept = Defining the options available and selecting the most appropriate (system trades)

- ミッションコンセプト=ミッションの仕組み
- 例：エンドユーザーを満足させるデータを取得する方法
- 次に示す4つの要素で構成されています（主にデータに関連しています）
- ミッションコンセプトの定義=利用可能なオプションを定義し、最も適切なものを選択する（システムトレード）

One of the Presentation slides

number	date	presenter	page	chapter	chairperson
1					
2	6/9	大城	T10	T2.1	大谷
3		紙谷	10*20	2.2*2.2.3	
4	6/16	大星	20*28	2.2.4*2.3	
5		大谷	28*38	2.4	紙谷
6	6/23	Eyoas	38*49	2.5	
7		Ramson	49*57	2.6*3.1.2	Victor
8	6/30	Victor	57*66	3.1.3*3.1.6	
9		大城	66*74	3.2*3.2.2.5	大星
10	7/7	Ramson	74*85	3.2.2.6*3.2.2.7	
11		紙谷	85*93	3.2.3*3.2.3.4	大城
12	7/14	Eyoas	93*103	3.2.3.5*3.3.3	
13		大星	103*111	3.3.4*3.5	Ramson
14	7/21	Timothy	111*122	3.6*4.2.2	
15		大谷	122*132	4.3*4.5.1	Eyoas
16	7/28	奥	132*140	4.5.2*4.6.1	
		藤井	140*148	4.6.2*4.6.4	Timothy
Summer Vacation					
17	9/22	山田	148*159	4.7*4.7.3	奥
18		細川	159*166	4.7.4*4.8.2	
19	9/29	吉村	166*176	4.8.3*4.10.2	藤井
20		千種	176*185	4.11*4.13.2	
21	10/6	Victor	185*193	4.13.3*4.14.2	山田
22		大城	193*202	4.14.3*4.18	
23	10/13	奥	203*210	4.20*4.21.2	吉村
24		細川	210*220	4.21.3*4.21.6	
25	10/20	藤井	220*231	4.22*4.24.3	細川
26		山田	231*239	4.25.1*4.27	
27	10/27	大城	239*250	4.28*5.1.1	千種
28		吉村	250*261	5.1.2*5.2.8	
29		千種	261*270	5.2.9*5.5.3	
30	11/10	Timothy	270*278	5.5.4*5.6.4	大城

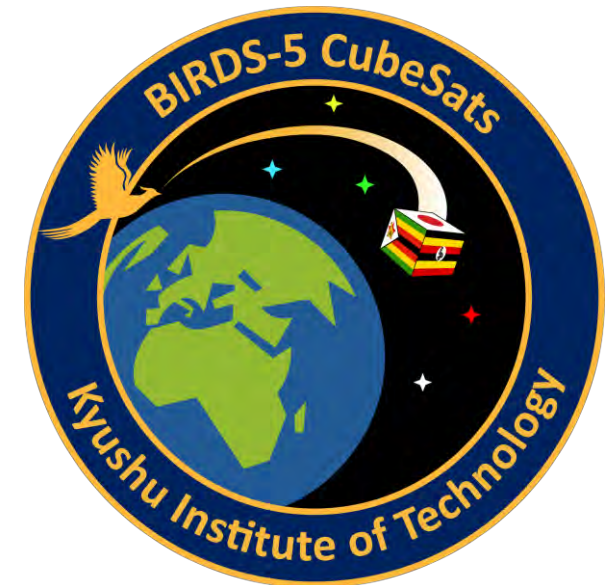
Seminar Schedule 2

This is also perfect opportunity for students to improve their presentation skills

Engineering Model (EM) Double Langmuir Probe Test



By : Kohei Kamitani
2021/9/19



What is DLP?

DLP is short for Double Langmuir Probe.

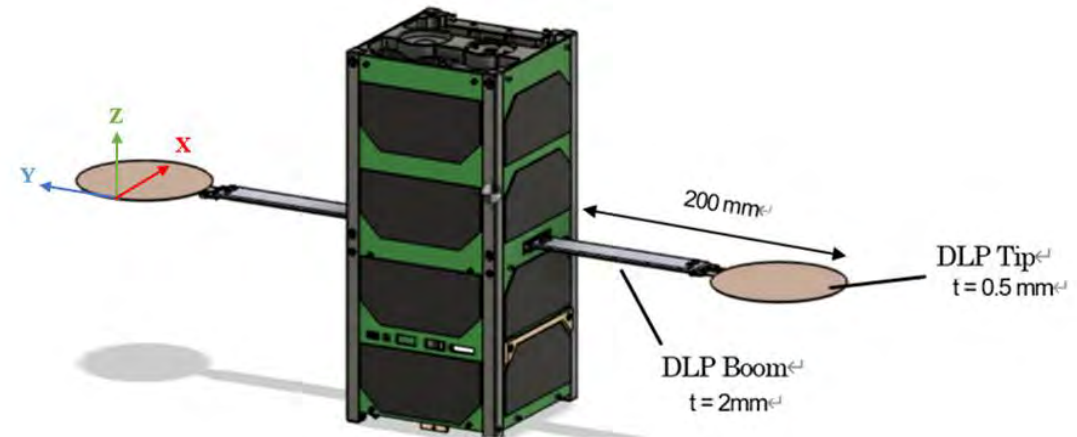
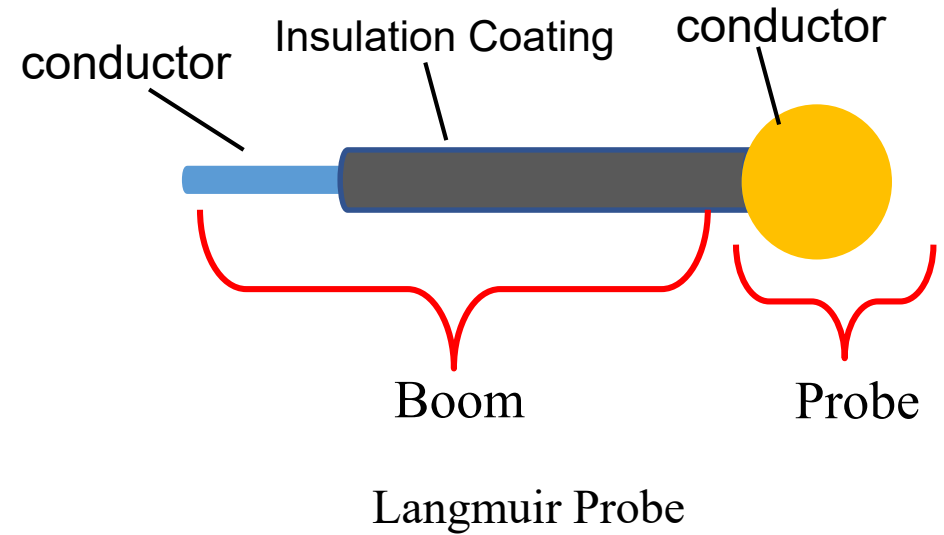
Double Langmuir Probe

The instrument that uses two Langmuir Probes to measure the plasma.

Langmuir Probe

The Langmuir probe consists of a Boom (insulated coated conductor) and a Probe (conductor).

In BIRDS-5, ionospheric plasma will be measured by DLP mounted on the 2U satellite.



DLP mounted on the 2U satellite

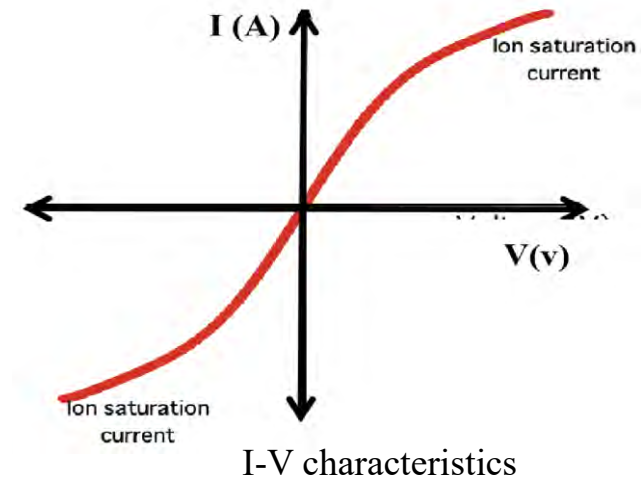
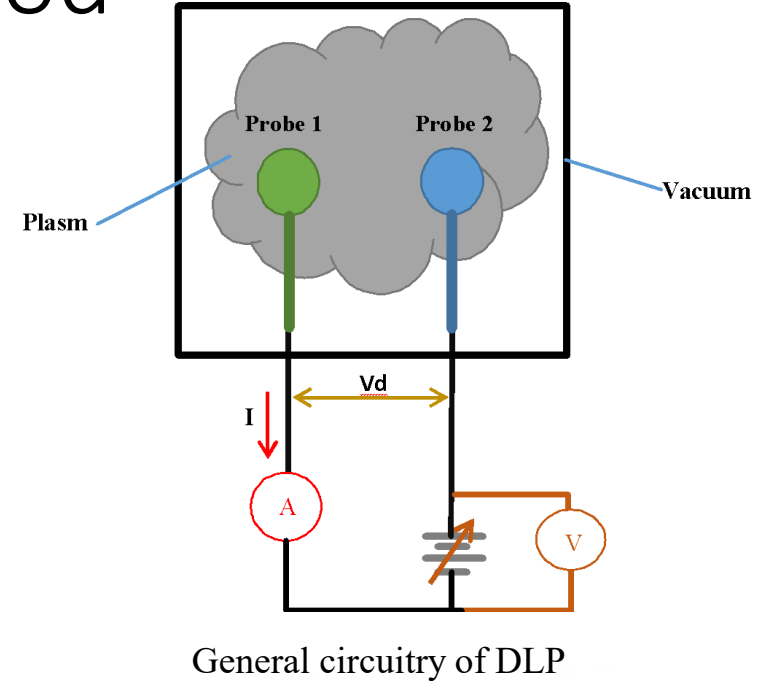
Plasma measurement method

Place the two probes in the plasma.

Apply a variable voltage between the two probes.

Current flows from the probe according to the applied voltage.

The characteristics of the plasma can be measured from the characteristics of the voltage and current.



DLP Board Problem

An experiment with EM DLP circuits was conducted using the facilities at the Institute of Space and Astronautical Science (ISAS) in Kanagawa, Japan

However, when the plasma was measured, it was not possible to measure the plasma accurately by using EM board.



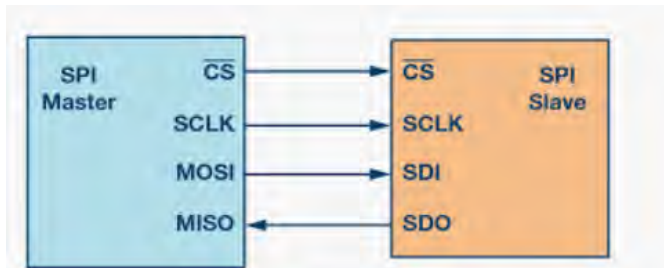
The model of M V rocket at the ISAS site



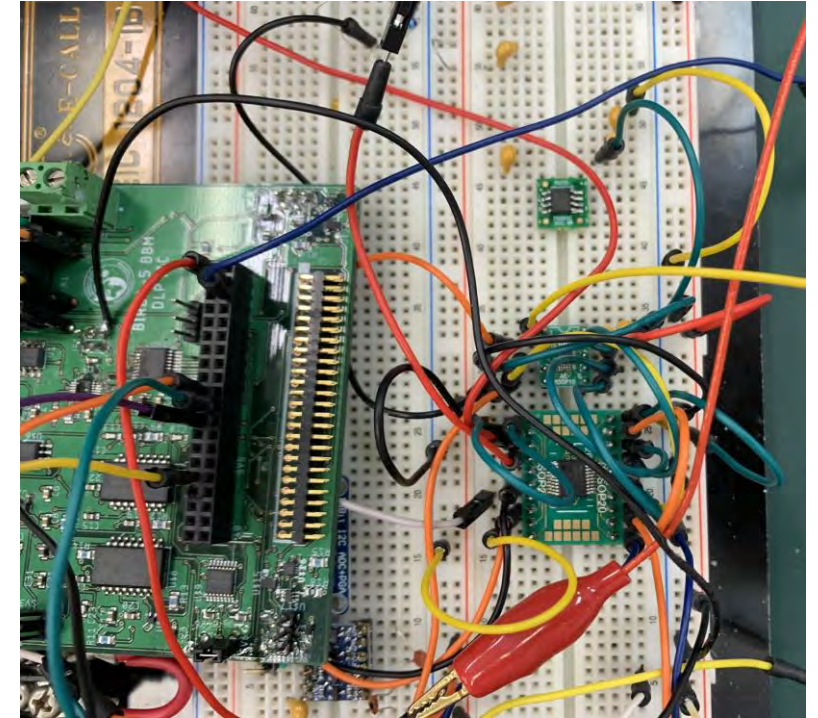
EM board

Solution of the problem

The reason why the plasma could not be measured accurately was because the Serial Peripheral Interface (SPI) communication line was connected incorrectly.



SPI configuration with master and a slave



Tests using a breadboard

This was confirm confirmed through troubleshooting tests on a breadboard that it worked correctly.

<https://www.analog.com/ru/analog-dialogue/articles/introduction-to-spi-interface.html>

END OF THIS SECTION

End of BIRDS-5 reports for this month



36. Report from Cambodia, University of Tokyo edition

Online space capacity building between Tokyo and Phnom Penh, by *Max Berthet*, UTokyo, September 2021

In this edition of “Reports from Cambodia”, we present our six-month online satellite design challenge, called UT-ITC Cube.



Group photo by Penghuy Srean: “The star”



Our team: 4 mentors, 6 members, 2 universities, 4 nationalities.
Institute of Technology of Cambodia + University of Tokyo.

Flow:

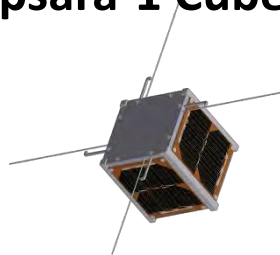
Dec. 2020: Kick-off

Apr. 2021: PDR

May 2021: KiboCUBE submission

June 2021: Closing ceremony

Result: Apsara-1 CubeSat design



Phnom Penh and Tokyo, connected by the common challenge of designing a satellite mission to address concrete needs in Cambodia.



Objectives of UT-ITC Cube

Social and technical

- To review current socio-economic needs in Cambodia which could be addressed via satellite.
- To propose a CubeSat mission to (partly) address these needs.
- To conduct a detailed design of the CubeSat.
- To submit the design for consideration by KiboCUBE.

Educational

- To develop skills in systems design, space engineering, project management, and cultural understanding.



Outputs

1U CubeSat design



Conference presentation on our capacity building activities



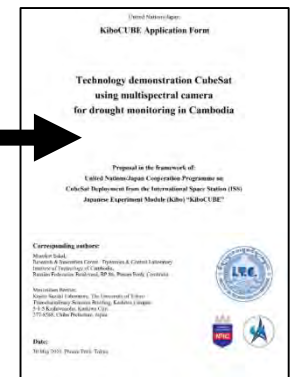
Morokot in Utah (online)



Our paper: <https://digitalcommons.usu.edu/smallsat/2021/all2021/229/>

Application to 6th round of KiboCUBE

174 pages, 97 design requirements, 81 scheduled tasks, consideration of 28 guidelines for the sustainability of outer space, 12 links with the UN's SDG targets



Why “Apsara”?

Reason 1: “An apsara (...) is a type of female spirit of the clouds and waters in Hindu and Buddhist culture.” (Wikipedia)
> Aligned with our mission objectives.



Reason 2: We use the word “apsara” as a call for continued support for aspiring female STEM students, researchers, entrepreneurs, and future leaders in Cambodia.

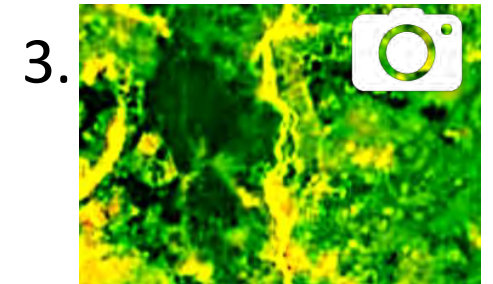
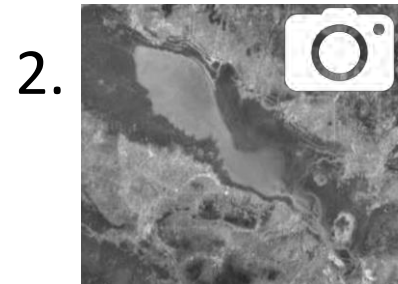
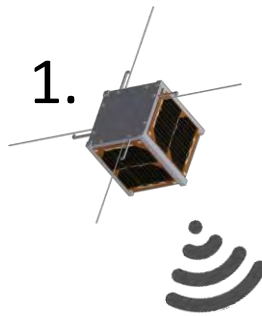
Mission statement

To develop the capability of solving social issues using space technology and to promote STEM education through the development of Cambodia’s first CubeSat.



Mission objectives

1. To make contact with satellite on orbit.
2. To take a picture of the Tonle Sap lake (=outreach).
3. To conduct land classification via multispectral imagery.



More details in our paper: <https://digitalcommons.usu.edu/smallsat/2021/all2021/229/>

Highlights



Cosmic baking by Sokserey



Japan culture evening: origami



Cambodia culture evening: Kla Klok



Max will be at Kyutech in October-November 2021. Please get in touch and let's have a chat!

End of report by Max

End of this **BIRDS Project Newsletter**

(ISSN 2433-8818)

Issue Number Sixty-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.

