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

ISSN 2433-8818

BIRDS Project Newsletter

Issue No. 62
(22 March 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

Archive website: http://birds1.birds-project.com/newsletter.html
All back issues are archived at this website.

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

La SEINE

SEIC Space Engineering International Course

All back issues of this newsletter can be easily downloaded.
Go to here: http://birds1.birds-project.com/newsletter.html and scroll down to the desired issue.

Table of Sections

Continued on the next page

From Uganda **The Guest Box**

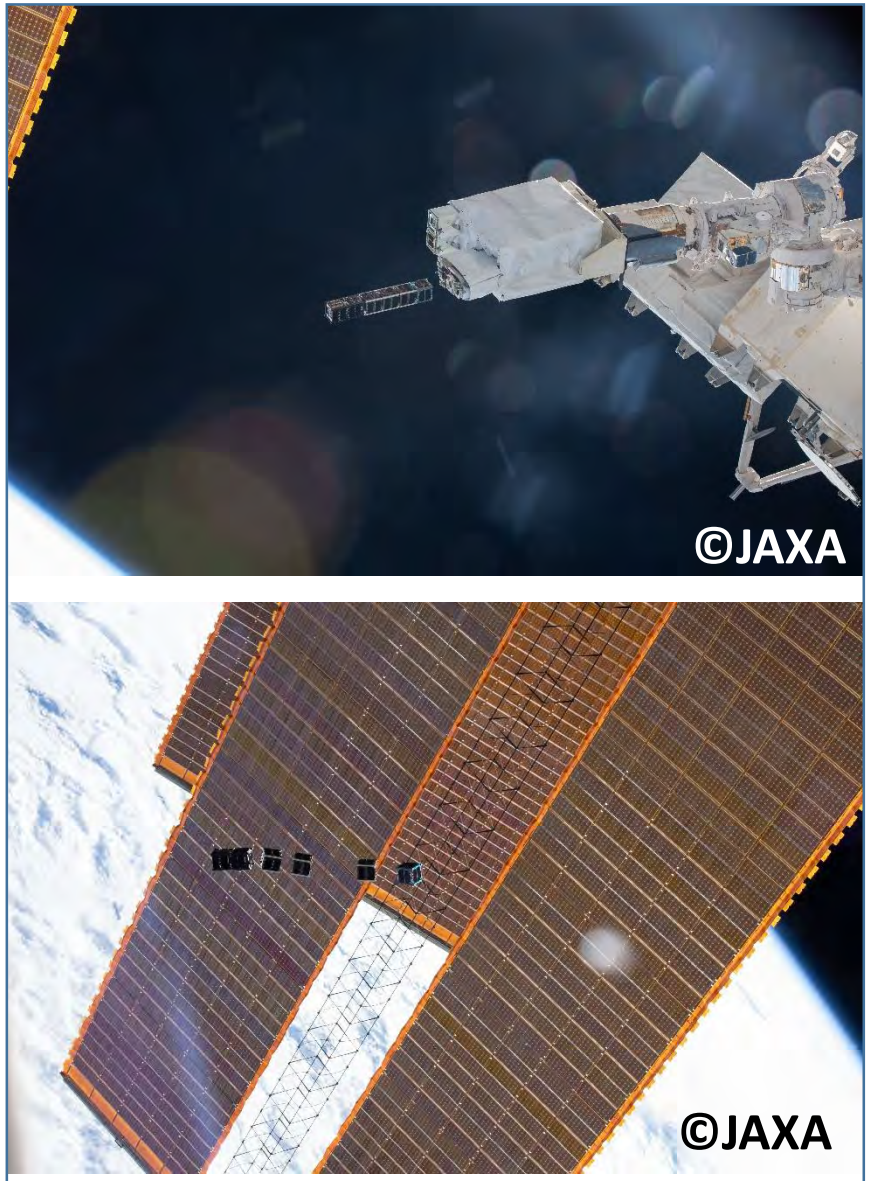
Matoke, known in English as East African Highland banana is a staple food in Uganda. It is used to prepare a traditional breakfast dish, that is enjoyed with tea made with milk and ginger. *Matoke* can also be eaten at any time of the day. breakfast dish contains fried *Matoke,* with beans or meat, cooked together in the same pot and served with
In the morning, when you walk into any street in Uganda with cafes, it is the irresistible aroma of *Matoke* breakfast that will greet you.

--- Derrick Tebusweke (BIRDS5, Uganda)

5-Min. Video Of How To Prepare *Matoke Breakfast Dish*
https://youtu.be/i8DKseP4bks

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

End of Table of Sections



BIRDS-4 satellites being released from the ISS
– thanks to JAXA for these great photos

JSPS provides the airfare funds of <u>BIRDS Int'l Workshops</u> and for <u>Ground Station Workshops</u>.

JSPS Reminder

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

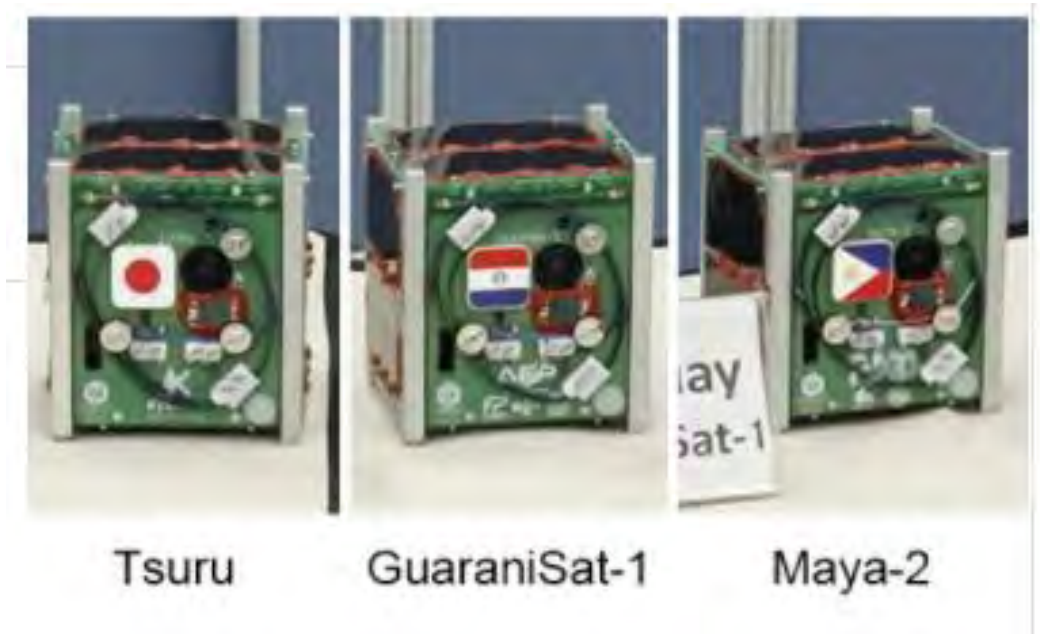
This work was supported by JSPS Core-to-Core Program, B. Asia-Africa Science Platforms.

01. BIRDS-4: JAXA makes announcement about deployment

公開: 2021年3月11日

「きぼう」から超小型衛星8機を3月14日(日)に放出する予定です

放出される衛星は、九州工業大学がBIRDSプロジェクト※1の第4弾（BIRDS-4）として開発したTsuru、フィリピン大学と共同で開発したMaya-2、パラグアイ宇宙庁が初で共同開発したGuaraniSat-1の3機。さらに、大阪府立大学が開発したOPUSAT-II、JAXAと提携している事業者（Space BD株式会社）の衛星として、リーマンサットプロジェクトが開発したRSP-01、株式会社ワープスペースが開発したWARP-01、同じくJAXAと提携している事業者（三井物産エアロスペース株式会社）の衛星として、テルアビブ大学（イスラエル）が開発したTAUSAT-1、STARS Space Service株式会社と静岡大学が開発したSTARS-ECの計8機です。

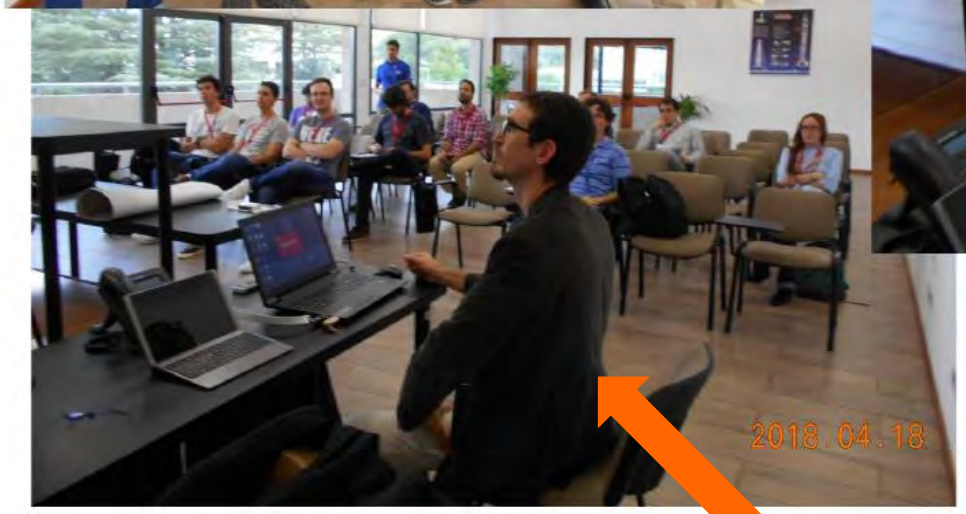


※1 BIRDSプロジェクト（正式名：Joint Global Multi Nation Birds）
JAXAと九州工業大学の戦略的パートナーシップ契約に基づき日本の九州工業大学とアジア・アフリカ諸国が参加して、超小型衛星を共同開発・運用する国際的な衛星開発プロジェクト。

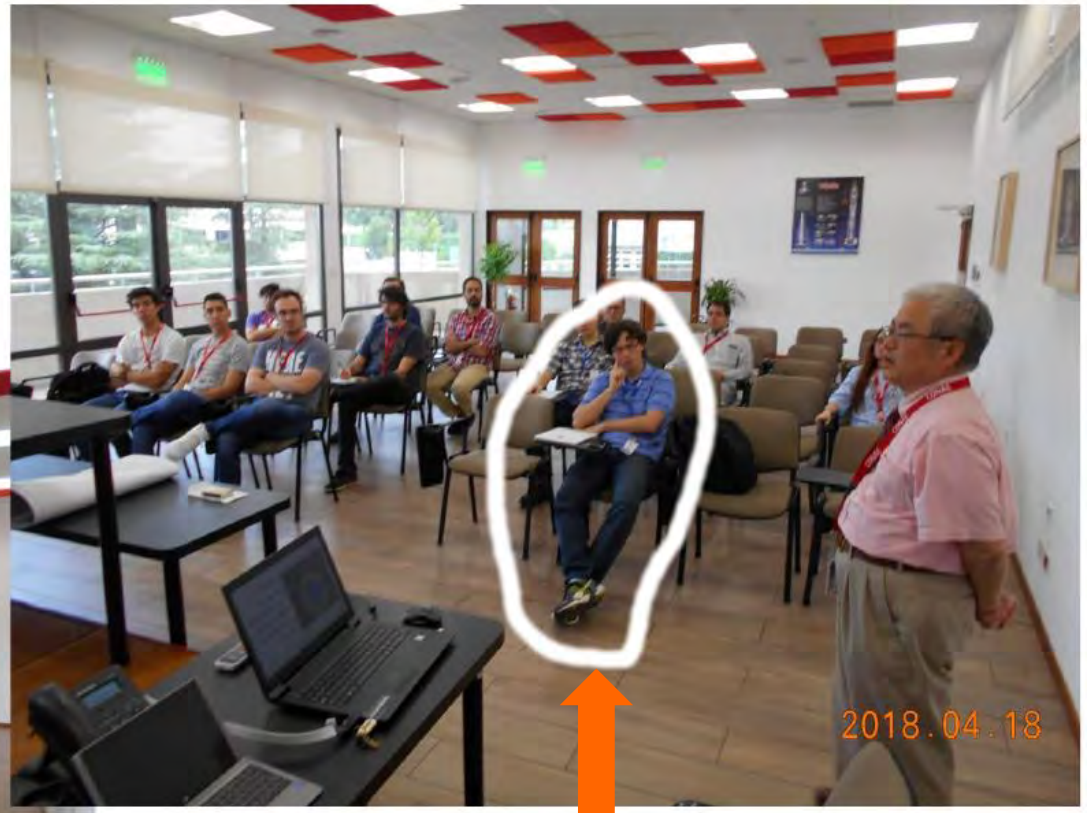
Read the rest at: https://iss.jaxa.jp/kibouser/pickout/72633.html

02. BIRDS-4: How Kyutech met AEP (the space agency of Paraguay)

Some of the seminar members during a coffee break



Below: CONAE facility at Cordoba, Argentina



Blas Fernando Vega Molinas, representative of Paraguay at this seminar

Marco Alvarez (of local university) organized this seminar

In April of 2018, I gave this seminar for **CONAE** (space agency of Argentina) in Cordoba, Argentina. During this seminar, I met Mr Molinas – circled in white at the left. He was the representative of Paraguay at this seminar. After the seminar, he gave me the business card of AEP Director Roman – and that is how it all started.

-- G. Maeda

03. BIRDS-4: NASA website explains BIRDS-4 to the general public, after deployment

Mar 17, 2021

Paraguay's First Satellite Deployed From the International Space Station

On March 14, the Paraguayan Space Agency (AEP) deployed a satellite from the International Space Station to help track a tiny parasite that causes Chagas disease. The satellite, Guaranisat-1, is the first developed and put into orbit by Paraguay. An estimated 8 million people in Mexico, Central America, and South America have Chagas disease, which if untreated can be life-threatening. Large-scale population movements from rural to urban areas of Latin America and other parts of the world have increased the geographic distribution of the disease.

Guaranisat-1 is part of the Joint Global Multi-Nation Birds Satellite project, or BIRDS, supported by the nation of Japan and the Kyushu Institute of Technology or Kyutech. Guaranisat-1 launched as a component of BIRDS-4, which also includes satellites from Japan and the Philippines. Previous BIRDS launches included first satellites from Ghana, Bangladesh, Mongolia, Bhutan, Nepal, and Sri Lanka.

"Our country's first satellite marks an historical moment," says Alejandro Román, AEP's "Paraguay to Space" project manager. "It is the first step in a long path to bring the benefits of space to Paraguay in areas like disaster risk reduction, agriculture, natural resources management, land management, and climate." A three-hour television program about the project drew 2.9 million viewers in a country with 7 million inhabitants, demonstrating its power as a tool for outreach about space benefits and careers in science, technology, and engineering.

← This was published by NASA 3 days after the ISS deployment of BIRDS-4 satellites.

It is a good article.
G. Maeda

SEE THE FULL ARTICLE HERE:

https://www.nasa.gov/mission_pages/station/research/news/birds-4-paraguays-first-satellite

BIRDS-4 CW Reception Form

BIRDS-4 Project recognizes the effort of amateur radio operators all over the world. Please fill out this reception form to provide information regarding reception of our signals. We will be sending QSL cards to acknowledge your valuable reception information. The name and photo associated with your Google account will be recorded when you upload files and submit this form.

You can see the BIRDS-4 QSL card designs on pages 37-41 in this issue of BPN !

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Access the BIRDS-4 CW reception form with the link below.

ACCESS THE CW RECEPTION FORM HERE:
https://docs.google.com/forms/d/1E7IKZRRgboRA3LCyQY13lgLu3ldYzEgZjqYOuusMPUI/viewform?ts=604e40f9&edit_requested=true

05. BIRDS-4: NHK New Web mentions the deployment

NHK NEWS WEB

国際

日本やパラグアイなどが共同開発 人工衛星が宇宙空間に

2021年3月15日 9時00分

日本や南米のパラグアイそれに、フィリピンの学生らが共同で開発した人工衛星が14日夜、国際宇宙ステーションから宇宙空間に放出されました。
パラグアイにとっては初めての衛星となり、今後、中南米で病気を媒介する虫の生息データの収集などへの活用が期待されます。
この衛星は、北九州市の九州工業大学で学ぶ日本やパラグアイ、それにフィリピンの学生らが自国の政府などの支援を受けて2年かけて開発した3機の衛星です。

先月、国際宇宙ステーションに運ばれ、日本時間の14日午後8時すぎに日本の実験棟「きぼう」から宇宙空間に放出され、地球を回る軌道に入りました。

この衛星は立方体の1辺がおよそ10センチ、重さが1キロ余りの超小型で、パラグアイにとって初めての人工衛星だということで、搭載した機器を使って、中南米で病気を媒介する虫の生息データの収集などへの活用が期待されます。

九州工業大学では、宇宙工学のすそ野を広げるため、ネパールやスリランカなどの途上国から人材を受け入れ、これまでに18機の衛星を宇宙に送り出していて、今後も、こうした支援を続けるということです。

SEE: https://www3.nhk.or.jp/news/html/20210315/amp/k10012915411000.html

06. BIRDS-4: Press release by UPD (Univ. of Philippines - Diliman)

FOR IMMEDIATE RELEASE
MARCH 14, 2021

Philippine CubeSat Maya-2 released to space from ISS

Screenshots of the BIRDS-4 CubeSats being deployed from the ISS. Captured from the JAXA livestream.

The Philippines' newest satellite has taken flight and is ready to take on its mission.

Maya-2, a cube satellite (CubeSat) made by Filipino engineers studying in Japan, was released to space from the International Space Station (ISS) on March 14, 2021 at around 7:20 p.m. PHT. This latest development follows the CubeSat's launch to the space station aboard a Cygnus NG-15 rocket (S.S. Katherine Johnson) on February 21, 2021, together with CubeSats Tsuru (Japan) and GuaraniSat-1 (Paraguay).

BIRDS-4 engineers with the BIRDS-4 satellites. *Back (Left to Right: Mark Angelo Cabrera Purio (Philippines), Izrael Bautista (Philippines), Hari Ram Shrestha (Nepal),Yuma Nozaki (Japan), Anibal Mendoza (Paraguay), Marloun Sejera (Philippines) Front (Left to Right): Daisuke Nakayama 中山大輔 (Japan), Yasir Abbas (Sudan), Adolfo Javier Jara Cespedes (Paraguay), Yiğit Çay (Turkey). Photo courtesy of the BIRDS-4 Project.*

The three satellites were designed and developed under the 4th Joint Global Multi-Nation Birds Satellite (BIRDS-4) Project of the Kyushu Institute of Technology (Kyutech) in Japan. Their primary purpose is technology demonstration, from which the learnings will be used as an educational platform. The three Filipino engineers were sent to Kyutech by the Department of Science and Technology's Science Education Institute (DOST-SEI) to pursue doctoral degrees as part of a scholarship program done in cooperation with the Space Science and Technology Proliferation through University Partnerships (STeP-UP) Project of the STAMINA4Space Program. Like its predecessor Maya-1 (decommissioned on November 23, 2020), Maya-2 can remotely collect data using a Store-and-Forward (S&F) mechanism and capture images and videos using an on-board camera. Its 1.3 kg frame is also equipped with an Automatic Packet Reporting System Message Digipeater (APRS-DP), attitude determination and control units for active attitude stabilization and control demonstrations, Perovskite solar cells, and a Latchup-detection chip.

CONTINUED

Maya-2 at a glance: Fast facts

What's next for Maya-2 now that it is in space?

"Right now we hope to execute all our missions with the help of other BIRDS ground stations around the world so that we could utilize the satellites to their full extent," said BIRDS-4 Project Manager Izrael Zenar Bautista. Maya-2 engineer Marloun Sejera adds that the team is now preparing for the satellite operation, which includes satellite health monitoring and mission execution.

With Maya-2 being the Philippines' fourth successful attempt to send a satellite to space in collaboration with Japan, this new milestone continues to nurture the longstanding partnership between the two nations.

"As the principal investigator of the BIRDS program, I am very happy to see Maya-2 deployed from the ISS," said BIRDS Project Principal Investigator Dr. Mengu Cho, who highlighted the BIRDS Project's goal to foster human resources to initiate indigenous space programs in non-space faring countries. "After seeing the infant space programs in many countries, I can say that the Philippines is one of the best examples of a success story… for Maya-2, three students from the Philippines are engaged and play key roles in the entire BIRDS-4 project. I am sure that they can be an important asset to the future Philippine space program. So far, I have supervised five Philippine students under the BIRDS program and have been always satisfied with their talents and sincereness to study."

Kyutech Assistant Professor George Maeda shares the same sentiments.

"Of all the BIRDS partners, none is more serious about developing in-country 'human resources' than the Philippines. Before you can make a spacecraft, you have to train engineers who know how to make them. The point is understood in your country," said Prof. Maeda. He adds, "And one more thing that is immensely impressive, you have propagated more capacity building through BIRDS-2S and BIRDS-4S [locally developed cubesats under the nanosatellite engineering track in EEEI UPD]. This means the 'BIRDS concept' is replicated inside of the Philippines. The fruit of knowledge acquired at Kyutech is taken to the Philippines and then applied to help others—this 'multiplication of knowledge' is precisely what we want to occur. This is what education is all about. It means to spread knowledge. Replace darkness with light on a broad scale."

Kyutech BIRDS-4 Team. *Back (Left to Right): Yiğit Çay (Turkey), Yuma Nozaki (Japan), Izrael Bautista (Philippines), Hari Ram Shrestha (Nepal), Tomoaki Murase (Japan), Daisuke Nakayama 中山大輔 (Japan), Mark Angelo Cabrera Purio (Philippines)*
Mid (Left to Right): Yasir Abbas (Sudan), Marloun Sejera (Philippines), Anibal Mendoza (Paraguay), Adolfo Javier Jara Cespedes (Paraguay), Hiroki Hisatsugu (Japan), Hoda Awny (Egypt), Timothy Leong (France), Dr. Takashi Yamauchi (Researcher, KyuTech)
Front (Left to Right): Dr. Sangkyun Kim (Assistant Professor, KyuTech), Prof. Cho Mengu (Professor, KyuTech / Principal Investigator, BIRDS Project), Dr. Hirokazi Masui (Assistant Professor, KyuTech)
Photo courtesy of Prof. George Maeda

After the scholars complete their studies, they have their eyes set on furthering the proliferation of the knowledge they gained in Japan and bring it back to the Philippines.

"After finishing my studies, the plan is to return to our respective institutions and carry out knowledge transfer to aspiring students in the field of science and technology," said Marloun Sejera.

Maya-2 engineer Mark Angelo Purio chimes that he also plans on returning to his alma mater, Adamson University, to impart what he learned in Japan after he completes his PhD degree and supporting government projects related to this endeavor. "Furthermore, I envision setting up our own ground station in the university to continue our efforts to support space-related activities while involving our students by providing them hands-on training."

CONTINUED

BIRDS-4 Project Manager Izrael Bautista

As for Izrael Zenar Bautista, he hopes to contribute to the growing space industry back home. "Maybe in the Philippine Space Agency or in the academe so that I could share the things I learned in Kyutech and apply it for the future satellites that our country will build. A startup relating to satellites or my research is also one that I'm looking into," he says. He also shared that he plans to continue what he has learned in Japan, from his research in Perovskite solar cells to satellite systems engineering, to hopefully providing meaningful output for the Philippines.

The investment made in these scholarships are well worth it, according to DOST-SEI Director Dr. Josette T. Biyo.

"We are ecstatic over Maya-2's successful deployment to space and incredibly proud of the DOST-SEI STeP-UP scholar-engineers behind it," she says. "They exemplify the perseverance of Filipinos and the brilliance of our science scholars. Maya-2 proves that the country's space program and science scholarships are investments worthy of people's support."

"The successful launching of Maya-2 makes me feel proud," said DOST Secretary Fortunato de la Peña. "The accomplishment made possible by our young researchers and engineers should make us confident that we can do more in the area of space technology. I have high hopes that we as a people will be able to benefit more from developments in this area—all towards making the quality of life of our people better."

As early as now, the Philippines can bank on witnessing more satellites be sent to space in the near future—with Maya-3, Maya-4, Maya-5, and Maya-6 already in their respective development and testing phases.

"Between Japan and the Philippines, there are other ongoing space-related collaborations, including STAMINA4Space Program," said Prof. Mengu Cho. "I am very happy to see [that the]

Philippines is engaged in Maya-3 to Maya-6 projects to build CubeSats domestically. These kinds of capacity building efforts will solidify the basis of the Philippine space program. I am certain that the deployment of Maya-2 will open another page of our collaboration."

Philippine Space Agency (PhilSA) Director General Dr. Joel Marciano, Jr. issued the following statement, "Just as how computers on Earth have helped to improve our lives, satellites like Maya-2 are 'computers in orbit' that work for us from space. With the release of Maya-2 from the ISS, the genius words of Mark Weiser, father of ubiquitous computing, resonate with renewed meaning and inspiration: '*The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it*'. Like Diwata-1, Maya-1 and Diwata-2 before it, Maya-2 now 'blends' into the background to serve and perform its mission. Godspeed, Maya-2!".

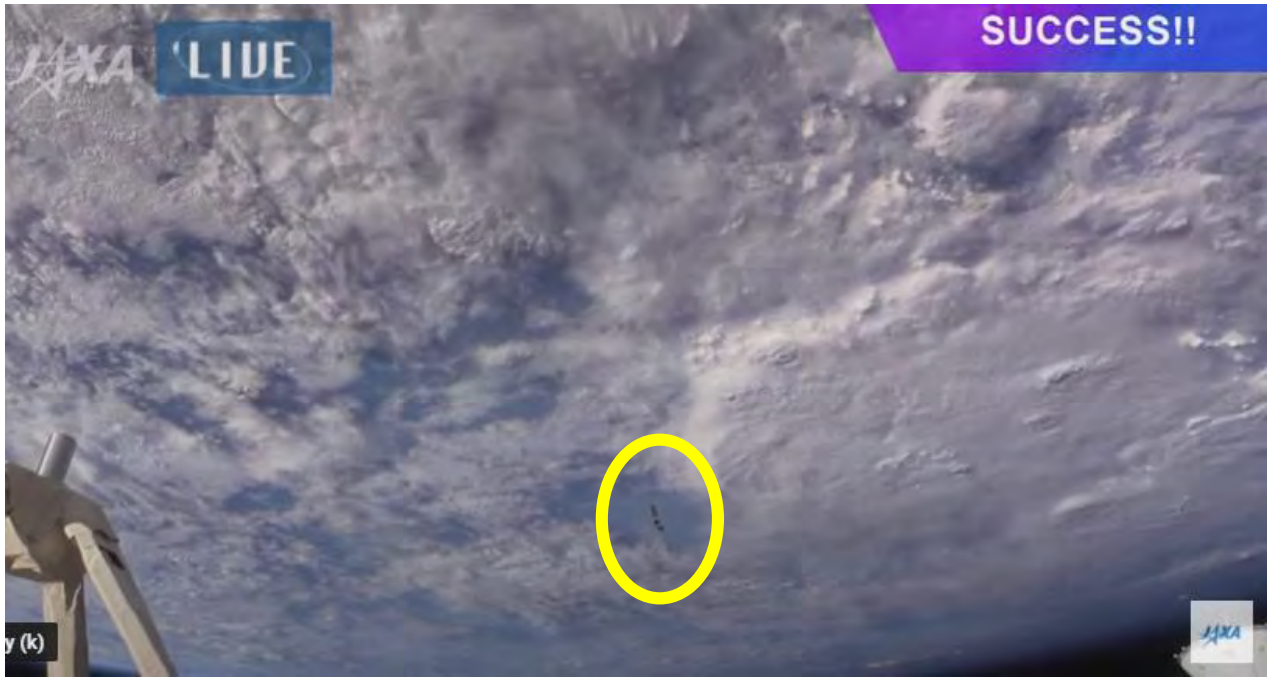
Please stay tuned for official updates about the initial contact between the CubeSats and the ground station.

END OF *PRESS RELEASE* FROM THE PHILIPPINES

07. BIRDS-4: View the entire JAXA broadcast of the event

「きぼう」から超小型衛星の放出
Small Satellites Deployment from “Kibo”
(OPUSAT-II, BIRDS-4, RSP-01,WARP-01)
JAXA | 宇宙航空研究開発機構

Post-deployment message from Kyutech President Oie →



THE ENTIRE BROADCAST BY JAXA FOR THIS DEPLOYMENT OF BIRDS-4:
https://www.youtube.com/watch?v=_OxEipWBuRI

08. BIRDS-4: Public viewing of deployment at Kyutech while observing pandemic protocols

PHOTOS BY G.MAEDA

Various members of BIRDS-1, BIRDS-2, BIRDS-3, BIRDS-4, and BIRDS-5, gathered at Kyutech on 14 March 2021 to watch the JAXA broadcast of BIRDS-4 deployment.

Deployment finally occurred shortly after 20:00, Japan Time.

Continued on the next page.

The BIRDS Nest developers:
Keenan (Trinidad) and Fahd (Morocco)

8-minute home video of this public viewing (includes segments of JAXA's broadcast video):
https://www.dropbox.com/s/o8vqjbxxbi02er3/014_BIRDS-4%3B%20public%20viewing%20at%20Kyutech%3B%2014-mar-2021.mp4?dl=0

Media Publications about Maya-2 & BIRDS-4 Satellite Project in the Philippines

Marloun P. Sejera

Mark Angelo C. Purio

Izrael Zenar C. Bautista

15 March 2021

Aside from the NASA Perseverance Rover landing on Mars, the launch of Cygnus spacecraft carrying BIRDS-4 Satellites got the attention of the Filipinos.

Being a non-space faring nation, Maya-2 , the second CubeSat of the Philippines gave pride to the country amidst the global pandemic.

The succeeding parts of this article shows a collection of some of the media publications in the Philippines about the Maya-2 launch to ISS.

Pinoy cube satellite dumating na sa International Space Station

ABS-CBN News

Posted at Feb 23 2021 07:38 AM | Updated as of Feb 23 2021 07:48 AM

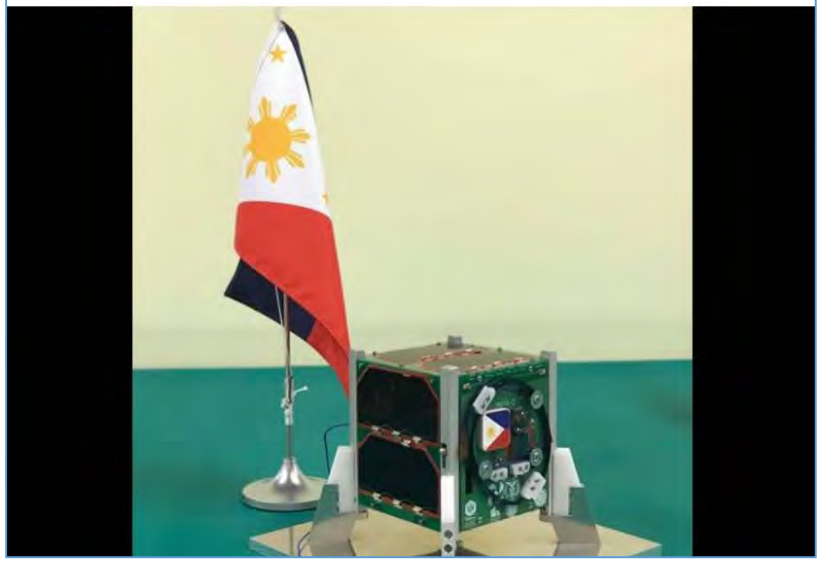
https://news.abs-cbn.com/video/news/02/23/21/pinoy-cube-satellite-dumating-na-sa-international-space-station?fbclid=IwAR21-aLVe5QznmcGG-W4iHiIpmk7ta1g41PXU6Z9df73j0bQI4wA_XS6_pc

ABS-CBN NEWS

Philippines' 2nd cube satellite Maya-2 launched into space

Josiah Antonio, ABS-CBN News

Posted at Feb 22 2021 08:51 PM | Updated as of Feb 22 2021 11:56 PM



https://news.abs-cbn.com/news/02/22/21/philippines-2nd-cube-satellite-maya-2-launched-in-space-station

Powered by Philstar.com

interaksyon Home Trends + Spotlights

Hobbies + Interests Rumor Cop

'Hindi ito pinagtatawanan': Space enthusiasts cheer on Philippines' 2nd cube satellite Maya-2 despite naysayers

By Catalina Ricci S. Madarang - February 23, 2021 - 2:54 PM

Share Facebook Twitter

The three cube satellites sent to space (Left to right) Maya-2 (Philippines), Tsuru (Japan), and GuaraniSat-1 (Paraguay) (Photo from STAMINA4Space website courtesy of BIRDS-4 Project)

https://interaksyon.philstar.com/trends-spotlights/2021/02/23/186093/hindi-ito-pinagtatawanan-space-enthusiasts-cheer-on-philippines-2nd-cube-satellite-maya-2-despite-naysayers/

GMA NEWS ONLINE
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SCITECH

Filtered By: Scitech

420 31 0 18

3 Filipino engineers behind Philippines' second cube satellite

Published February 21, 2021 8:04pm

Listen to this article now
02:42 Powered by Trinity Audio

The Maya-2 CubeSat, developed by three Filipino engineers, was officially launched at the International Space Station on Sunday afternoon, along with satellites from Japan and Paraguay, as part of the Joint Global Multi-Nation Birds Satellite Project (BIRDS-4).

Behind the successful launch is a team composed of three Filipinos, all of them pursuing doctorates in Space Systems Engineering and Space Engineering at the Kyushu Institute of Technology (Kyutech) in Kitakyushu, Japan.

advertisement

https://www.gmanetwork.com/news/scitech/technology/776831/3-filipino-engineers-behind-philippines-second-cube-satellite/story/

A post from the Facebook Account of the Secretary of the Department of Science and Technology, Philippines

Fortunato de la Peña
February 21 at 1:31 AM ·

Today, 21 February 2021 (1:36 AM Philippine Standard Time), the Philippines will once again make another historic mark in the field of space science!

The Maya-2 CubeSat🇵🇭 (cube satellite), developed by three Filipino students, will be launched to the **International Space Station** (ISS) along with Paraguay's GuaraniSat-1 CubeSat🇵🇾 and Japan's Tsuru CubeSat🇯🇵 for the **BIRDS 4 Satellite Project - KyuTech** aboard the Northrop Grumman CRS-15 mission.

The Filipino students who built... **See More**

NEWS 5 Facebook Page

https://www.untvweb.com/news/nasa-introduces-ph-satellite-maya-2-to-launch-in-2021/

https://mb.com.ph/2021/02/20/meet-the-brains-behind-ph-second-nanosatellite-maya-2/

https://mb.com.ph/2021/02/25/how-the-philippines-space-program-evolved-from-late-comer-to-fast-learner/

Republic of the Philippines
PHILIPPINE NEWS AGENCY

HOME NATIONAL PROVINCIAL OPINION BUSINESS FEATURES HEALTH
FOREIGN SPORTS TRAVEL ENVIRONMENT SCITECH

PH eyes launching 3 cube satellites in 2020

By Ma. Cristina Arayata March 11, 2020, 7:07 pm

Share Share 361

CUBESATS. DOST Secretary Fortunato dela Peña says the agency eyes launching three cube satellites in 2020. This is among the 20 projects that the department would launch this year. *(PNA file photo by Cristina Arayata)*

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DOST exec hopes transport sector would adopt 'DRIVER PH'

DOST to continue assisting startups, OFWs to help rebuild economy

TikTok to help promote sci-tech in PH

PH, Japan, UK to collab on 3 SDG-related projects

PH needs to spend more for R&D: DOST

https://www.pna.gov.ph/articles/1096292

INQUIRER.NET

First nanosatellite made by Filipinos returns from space after 2 years

By: Niña V. Guno - @NGunoINQ

INQUIRER.net / 06:37 PM November 29, 2020

First Philippine-made nanosatellite Maya-1. Image: STAMINA4Space

The eagle — or rather, the maya — has landed.

Maya-1, the first nanosatellite of the Philippines, came back from space on Nov. 23 after two years orbiting the Earth, according to a statement on Friday, Nov. 27, from the Stamina4Space program, which is funded by the Department of Science and Technology (DOST).

https://technology.inquirer.net/105967/first-nanosatellite-made-by-filipinos-returns-from-space-after-2-years

INQUIRER.NET

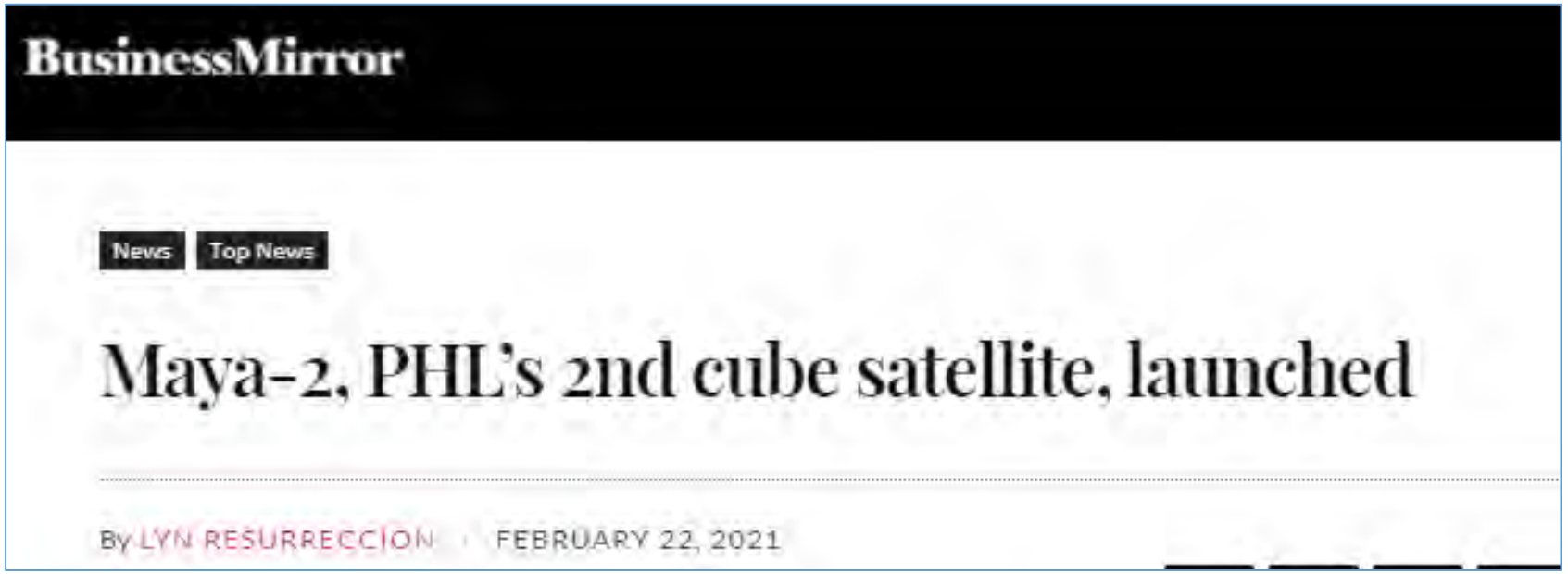
Second nanosatellite made by Filipinos launched to space

By: Niña V. Guno - @NGunoINQ

INQUIRER.net / 04:51 PM February 22, 2021

https://technology.inquirer.net/107941/second-nanosatellite-made-by-filipinos-launched-to-space

https://businessmirror.com.ph/2021/02/22/maya-2-phls-2nd-cube-satellite-launched/



BusinessMirror

News Top News

Maya-2, PHL's 2nd cube satellite, launched

By LYN RESURRECCION · FEBRUARY 22, 2021

SENATE OF THE PHILIPPINES
18th Congress

Home | About | Senators | Committees | Secretariat | Legislative Documents | Publications | GAD | Bagong Senado

18th Congress
Senate Resolution No. 657
COMMENDING THREE (3) FILIPINO SPACE ENGINEERS (MAYA-2 CUBESAT DEVELOPERS)
Filed on February 22, 2021 by Villar, Cynthia A., Binay, Maria Lourdes Nancy S.

Overview | Committee Referral | Leg. History | All Information

Long title

RESOLUTION COMMENDING THE THREE (3) FILIPINO SPACE ENGINEERS, NAMELY IZRAEL ZENAR C. BAUTISTA, MARK ANGELO C. PURIO AND MARLOUN P. SEJERA, FOR DEVELOPING THE PHILIPPINES' SECOND NANOSATELLITE CALLED THE MAYA-2 CUBESAT THAT WAS SUCCESSFULLY LAUNCHED TO THE INTERNATIONAL SPACE STATION ON 21 FEBRUARY 2021 AT 1:36 AM UNDER PHILIPPINE STANDARD TIME

Download
SRN-657 (as filed) 2/24/2021 215.6KB

Scope

National

Legislative status

Pending in the Committee (2/24/2021)

Legislative Documents
- Bills
- Resolutions
- Journals
- Committee Reports
- Republic Acts
- Adopted Resolutions
- Treaties
- Statistical Data

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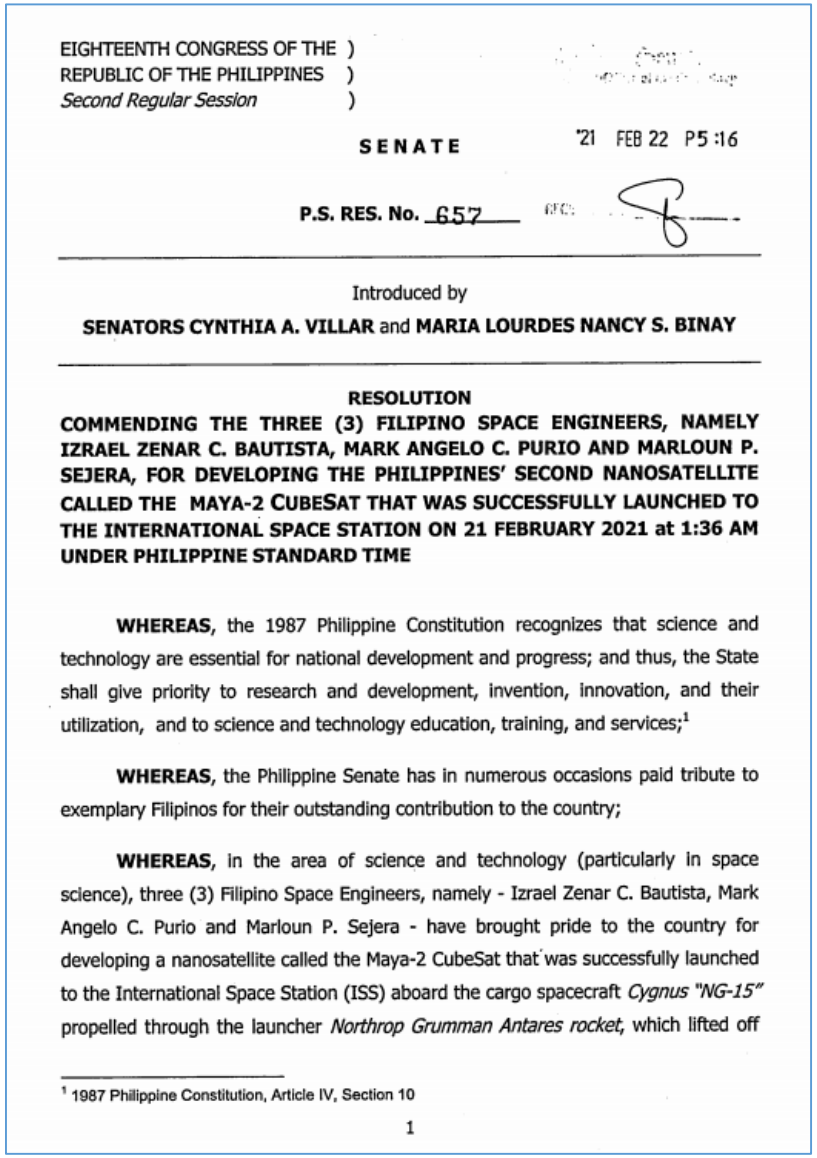
Filipino team members were recognized by the Senate of the Philippines through Senate Resolution No. 657.



EIGHTEENTH CONGRESS OF THE)
REPUBLIC OF THE PHILIPPINES)
Second Regular Session)

SENATE

'21 FEB 22 P5 :16

P.S. RES. No. 657

Introduced by

SENATORS CYNTHIA A. VILLAR and MARIA LOURDES NANCY S. BINAY

RESOLUTION

COMMENDING THE THREE (3) FILIPINO SPACE ENGINEERS, NAMELY IZRAEL ZENAR C. BAUTISTA, MARK ANGELO C. PURIO AND MARLOUN P. SEJERA, FOR DEVELOPING THE PHILIPPINES' SECOND NANOSATELLITE CALLED THE MAYA-2 CUBESAT THAT WAS SUCCESSFULLY LAUNCHED TO THE INTERNATIONAL SPACE STATION ON 21 FEBRUARY 2021 at 1:36 AM UNDER PHILIPPINE STANDARD TIME

WHEREAS, the 1987 Philippine Constitution recognizes that science and technology are essential for national development and progress; and thus, the State shall give priority to research and development, invention, innovation, and their utilization, and to science and technology education, training, and services;[1]

WHEREAS, the Philippine Senate has in numerous occasions paid tribute to exemplary Filipinos for their outstanding contribution to the country;

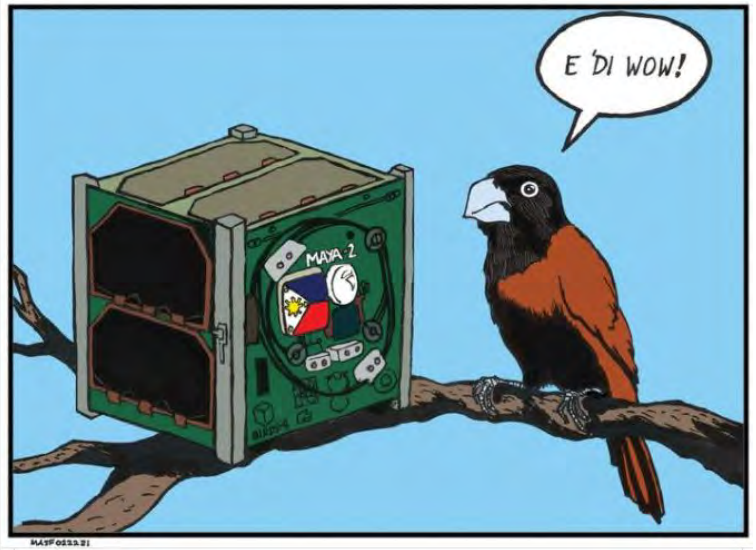
WHEREAS, in the area of science and technology (particularly in space science), three (3) Filipino Space Engineers, namely - Izrael Zenar C. Bautista, Mark Angelo C. Purio and Marloun P. Sejera - have brought pride to the country for developing a nanosatellite called the Maya-2 CubeSat that was successfully launched to the International Space Station (ISS) aboard the cargo spacecraft *Cygnus "NG-15"* propelled through the launcher *Northrop Grumman Antares rocket*, which lifted off

[1] 1987 Philippine Constitution, Article IV, Section 10

1

A post from the Facebook Account of Philstar.com giving an overview about Maya-2 CubeSat

SciKomiks, a science-based filipino comics page even made a 'meme' about Maya-2 and Maya Bird.



SciKomiks
February 22 at 7:50 PM ·

Gaya ng ibang cube satellite (CubeSat), ang gawang-Pinoy na Maya-2 ay may sukat na 10 cm x 10 cm x 10 cm. Mas maliit lang ito nang kaunti kaysa sa ibong hiniraman nito ng pangalan, ang maya o chestnut munia (*Lonchura atricapilla*), na karaniwa'y lumalaki hanggang 12 cm. Noong February 21, 2021, ipinadala ang Maya-2 sa International Space Station (ISS) bilang bahagi ng satellite project na BIRDS 4, isang inisyatibo ng STAMINA4Space Program ng DOST-Philippines katuwang ang Kyushu Institute of Technology sa Japan.

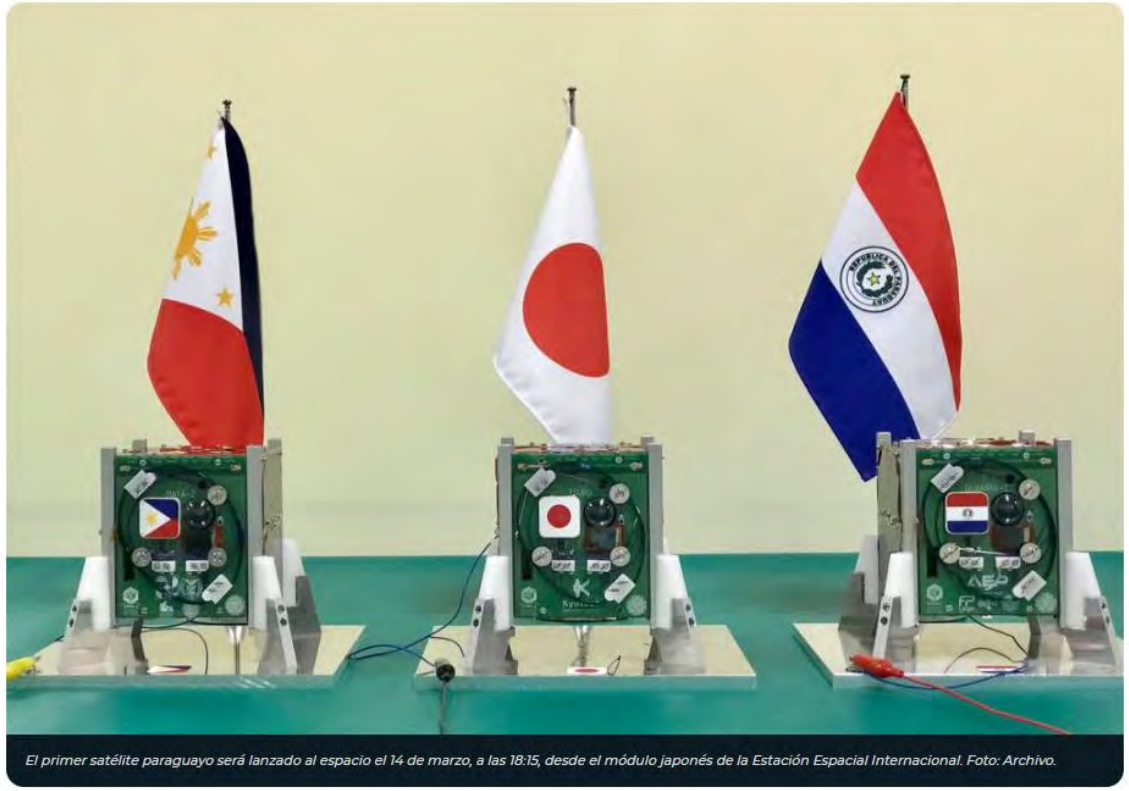
[Just like other cube satellites (CubeSats), the Pinoy-made Maya-2 measures 10 cm x 10 cm x 10 cm. It's only slightly smaller than the bird it borrowed its name from: the maya or chestnut munia (*Lonchura atricapilla*), which usually grows up to 12 cm long. On February 21, 2021, Maya-2 was sent to the International Space Station (ISS) as part of the BIRDS 4 Satellite Project, an initiative by the Department of Science and Technology's STAMINA4Space Program hosted by the Kyushu Institute of Technology in Japan.]

END OF THIS ARTICLE

Media Publications about GUARANISAT-1 & BIRDS-4 Satellite Project in Paraguay

Anibal Mendoza

15 March 2021



El primer satélite paraguayo será lanzado al espacio el 14 de marzo, a las 18:15, desde el módulo japonés de la Estación Espacial Internacional. Foto: Archivo.

TENDENCIAS

9 DE MARZO DE 2021 13:02

GuaraniSat-1 se pondrá en órbita este domingo

https://www.lanacion.com.py/tendencias/2021/03/09/guaranisat-1-se-pondra-en-orbita-este-domingo/

Ya fue puesto en órbita el primer satélite paraguayo GuaraniSAT-1

Este domingo fue puesto en órbita el primer satélite paraguayo GuaraniSAT-1 desde la Estación Espacial Internacional (ISS). El profesor Alejandro Román, director General de Ejecución y Desarrollo Aeroespacial y Coordinador General del Proyecto Paraguay al Espacio, manifesó que se trata de un "día histórico, un día de júbilo y un día de celebración para el país".

Mar 14, 2021

https://nanduti.com.py/ya-fue-puesto-en-orbita-el-primer-satelite-paraguayo-guaranisat-1

El primer satélite paraguayo ya está en órbita

14 / MARZO / 2021

COMPARTE EL ARTÍCULO

En la mañana de este domingo, 14 de marzo, se concretó la puesta en órbita el primer satélite paraguayo, GuaraniSAT-1, desde la Estación Espacial Internacional (EEI).

El evento, que marca un hito para la ciencia en Paraguay, fue seguido en nuestro país desde el segmento terrestre del GuaraniSat-1, ubicado en el campus de la Universidad Nacional de Asunción (UNA). En la ocasión estuvieron presentes la Rectora de la UNA, Prof. Dra. Zully Vera de Molinas, el Decano de la Facultad Politécnica, Prof. Ing. Teodoro Salas, el Director de la Agencia Espacial del Paraguay (AEP), Cnel. DEM (R) Liduvino Vielma, la Embajadora de Japón en Paraguay, S.E. Yoshie Otsuka, Directores Generales de la UNA, miembros de la Mesa Directiva de la AEP, y en forma telemática, el Embajador de Paraguay en Japón, S.E. Raúl Florentín, la Rectora de la Universidad Metropolitana de Asunción, Prof. Dra. María Liz García de Arnold, así como otros representantes de las instituciones parte y de diferentes medios de comunicación.

La puesta en órbita fue coordinada con la Estación Espacial Internacional desde la Agencia Japonesa de Exploración Espacial (JAXA), pues el satélite fue lanzado desde el módulo japonés KIBO.

https://www.una.py/2021/el-primer-satelite-paraguayo-ya-esta-en-orbita

https://www.lanacion.com.py/pais/2021/03/14/en-orbita-el-primer-nanosatelite-paraguayo-guaranisat1/

A post from the Twitter Account of the astronaut Soichi Noguchi congratulating Paraguay for its 1st satellite

Picture of the capital city of Paraguay, Asunción, taken from the ISS

11. BIRDS-4: Barbecue party!

To celebrate the graduation of our fellow BIRDS members, Anibal Mendoza and Tomoaki Murase, as well as the successful launch and upcoming deployment of our satellites, the BIRDS4 team organized a party at Yomiya Park.

Some members went to Costco to buy meat (beef, pork and lamb). Yasir brought his grilling set and marinated chicken. During the party, we observed social distancing while eating and grilling.

We congratulate Anibal and Tomoaki for their graduation!

BIRDS-4 members having a barbecue party outdoors.

Date of this event was 6 March 2021

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by:

Izrael Zenar BAUTISTA

BIRDS-4 Barbecue party!

It was a cloudy and windy on that day but it won't stop us from filling our tummies with meat.

The marinated chicken made by Yasir's wife tastes amazing!

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by:

Izrael Zenar BAUTISTA

12. BIRDS-4: Combined Space Operations Center (CSpOC); TLE

With the release of BIRDS-4 satellites from the ISS into orbit, the two-line elements (TLE) of the satellites needs to be determined and this is done by tracking them in space. This job is one of the functions of the Combined Space Operations Center (CSpOC). It is a US led multination space operation center which was established on May 18, 2005 with a mission to "Execute operation command and control of space forces to achieve theater and global objectives[1]"

CSpOC Seal

References:
[1] https://www.stratcom.mil/Portals/8/Documents/CSpOC_Factsheet_2018.pdf
[2] https://www.peterson.spaceforce.mil/About/Fact-Sheets/Display/Article/2356622/18th-space-control-squadron/

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by:

Izrael Zenar BAUTISTA

18th Space Control Squadron

A partner unit of the CSpOC is the 18th Space control squadron (18 SPCS) which is under the United States Space Force. Its task is to provide 24/7 support to the space surveillance network by maintaining and managing the space situational awareness (SSA) sharing program[2]. This catalog can be accessed by registering to space-track.org. To allow the 18 SPCS to track and determine the telemetry, an owner of the satellite must contact them prior to deployment in space of their satellite. In lieu with this, the BIRDS-4 program has contacted them and provided information such as contact information of owner, launch information, satellite and orbit information.

18th SPCS' emblem

Homepage of space-track.org

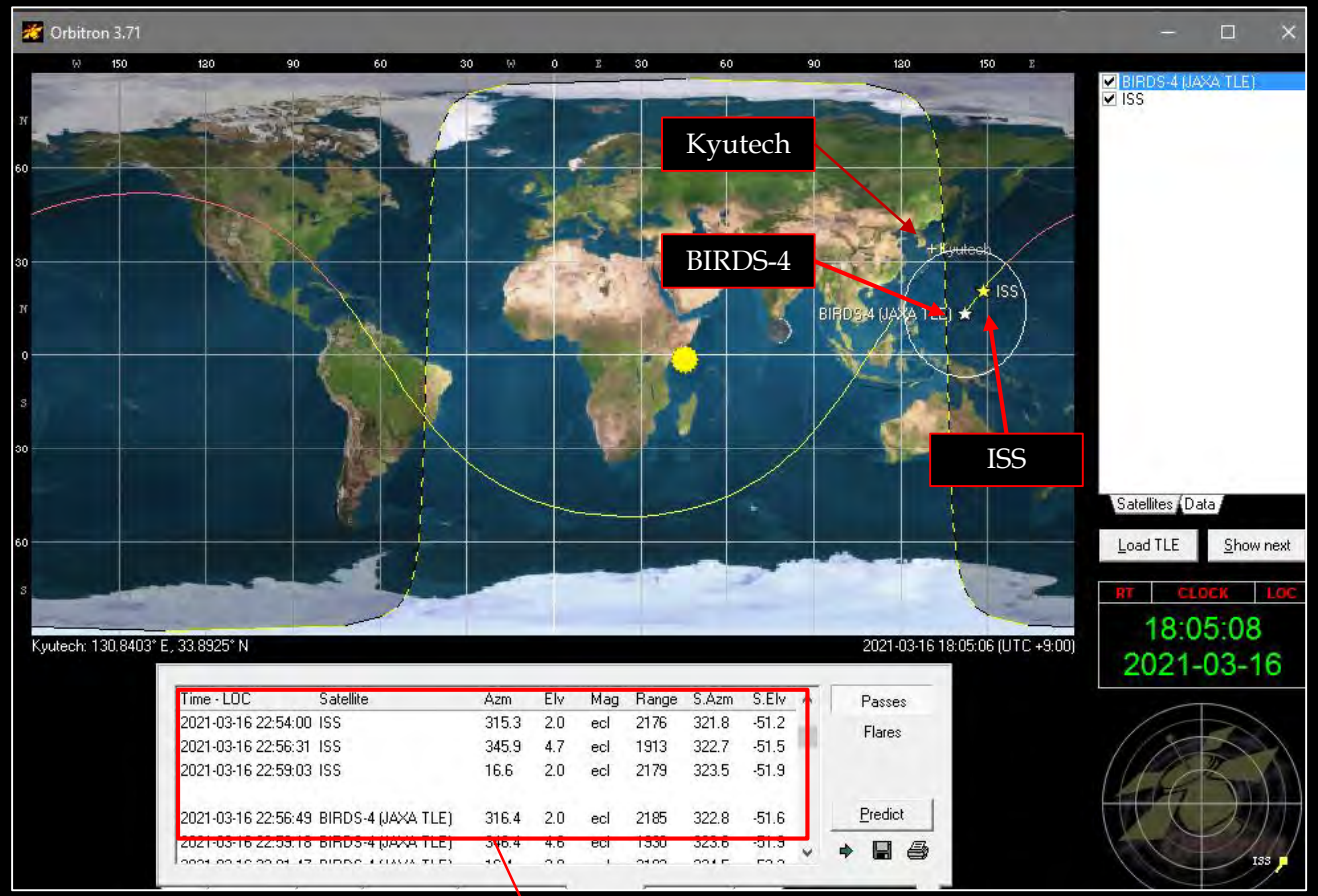
BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by:

Izrael Zenar BAUTISTA

ISS TLE

It takes a couple of days before CSpOC can provide TLE of the newly-deployed satellites. For this reason, the BIRDS-4 team used ISS' TLE as reference to track down the satellites on the day of the deployment. It is expected that satellites are a few minutes behind ISS. A day after the satellite deployment, JAXA provided a TLE of ISS and BIRDS-4 satellites. The team also refers to space community forums or sites which also provide updates about the satellites. These will be used until CSpOC officially publish the TLE of the individual satellites.



Predicted ISS and BIRDS-4 satellite pass at Kyutech ©Orbitron

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by:

Marloun Sejera

13. BIRDS-4: Space Tech Lightning Talk, Volume 1

For this ISS deployment, 5 Japanese groups developed 7 CubeSats in total. WARPSPACE Inc. that developed 1U CubeSat that named “WARP-01” and “日輪” planned to make a Lightning Talk Session so that ordinally Japanese can reach and be interested in the technical things. I talked about BIRDS-4 and I think this is a rare opportunity to talk our project in Japanese.

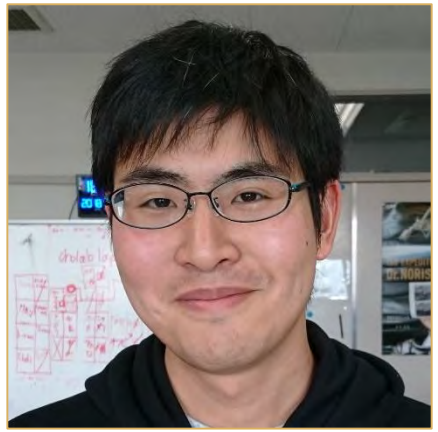
I hope these sessions will be conducted again and again.

You can see from this link : https://www.youtube.com/watch?v=rektrp9YP3U

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

By:

Daisuke NAKAYAMA



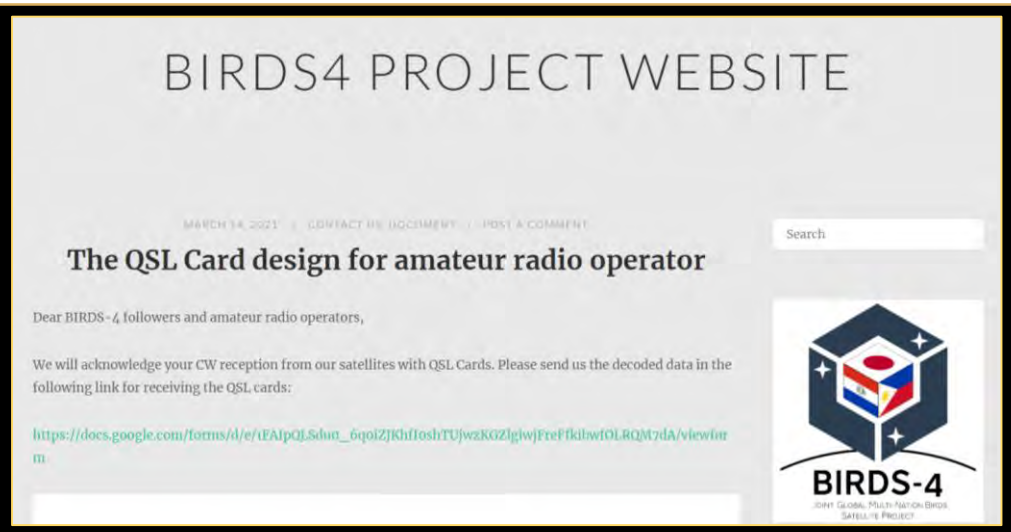
BIRDS-4 QSL Card Designs

BIRDS-4 satellite project recognizes the contributions of the amateur radio community in our ground operations.

Throughout the BIRDS project history, they have been key players in assisting the teams to monitor the satellite health through the CW beacon.

To show our appreciation, we shall be sending QSL Cards to those who report the CW beacon reception.

The card designs are as follows:



Announcement of the QSL Card design posted in the BIRDS-4 Satellite Project Website. Source: https://birds4.birds-project.com/

Facebook announcement of the QSL Card Designs. Source: *https://www.facebook.com/Birds4SatelliteProjectKyutech/posts/892733121516577*

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by:

Mark Angelo PURIO

BIRDS-4 QSL Card Designs (FRONT)

Front side photo shows the 300-meters wooden "Tsuru no Mai" Bridge as it crosses over "Tsugaru Fujimi" lake. In the far background we see the beautiful Mt. Iwaki.
Aomori Prefecture, Japan.
In Japanese Tsuru means the crane bird which is a symbol for longevity.

Designed by Yasir Abbas
Image used with permission from:
www.tohokukanko.jp

TSURU (Japan)

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by:

Mark Angelo PURIO

BIRDS-4 QSL Card Designs (FRONT)

The image represents the diverse Philippine milieu. Rich in breathtaking landscapes such as the chocolate hills, Mayon Volcano and the Banaue Rice Terraces, it is also home to unique animal species like the peculiar Tarsier and the mighty Philippine eagle. Moreover, its cities are teeming with the famous jeepney while in rural areas one will find houses commonly known as the "Bahay Kubo". Now mostly worn in events and formal occasions, the "Baro't Saya and Barong Tagalog" is still a popular garment.
This depicts a woven tapestry of natural scenery, extraordinary flora & fauna and a rich cultural heritage which makes the archipelago distinctive and extraordinary.

Designed by Ericka Picar

MAYA-2 (Philippines)

BIRDS-4
Joint Global Multi-Nation Birds Satellite Project

Article by:

Mark Angelo PURIO

BIRDS-4 QSL Card Designs (FRONT)

The "Tereré" is a traditional, declared official and cultural heritage by Paraguayan congress, drink invented by the Guaraní natives, people who are living in Paraguay. It is usually prepared in a container called "Guampa" in which cold water with medicinal and refreshing herbs are added. It is a very social drink, and it's consumed by all social classes at any time of the day.

Designed by Anibal Mendoza

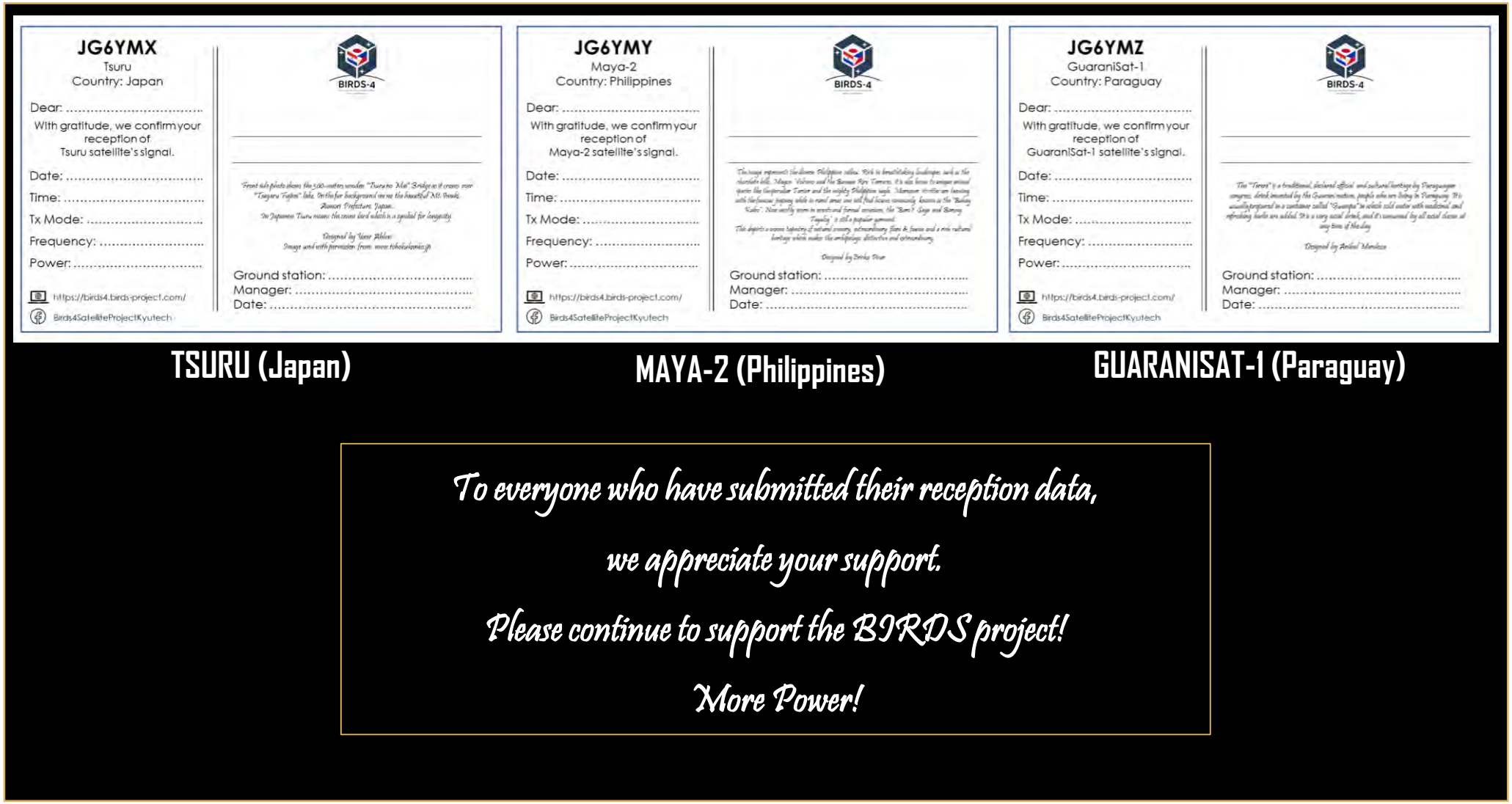
GUARANISAT-1 (Paraguay)

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by:

Mark Angelo PURIO

BIRDS-4 QSL Card Designs (BACK)



TSURU (Japan) MAYA-2 (Philippines) GUARANISAT-1 (Paraguay)

To everyone who have submitted their reception data,

we appreciate your support.

Please continue to support the BIRDS project!

More Power!

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by:

Mark Angelo PURIO

UiTMSAT COLUMN

Column No. 15

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

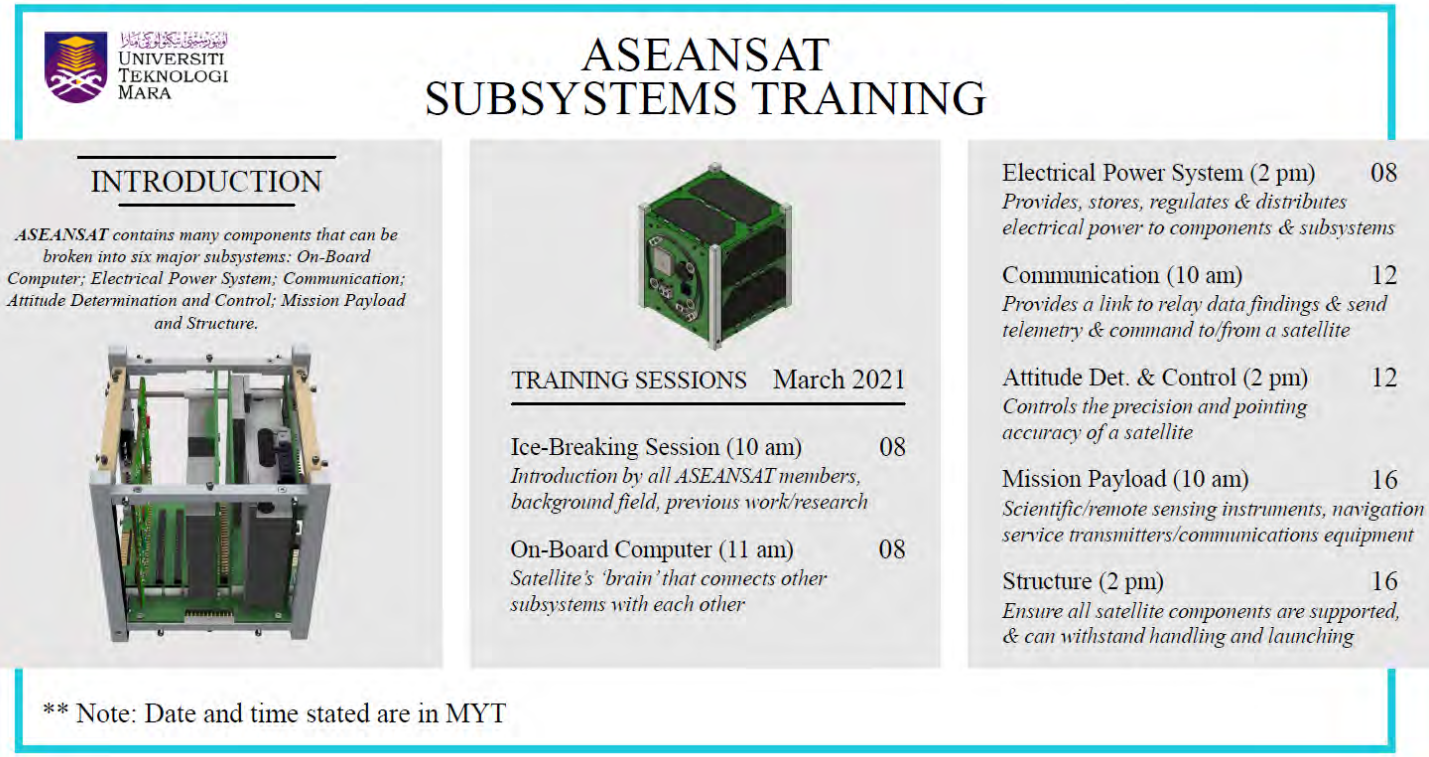
UNIVERSITI TEKNOLOGI MARA

UiTM Sentiasa Di Hatiku
"UiTM Always in My Heart"

THE INITIAL STAGE OF ASEANSAT PROJECT

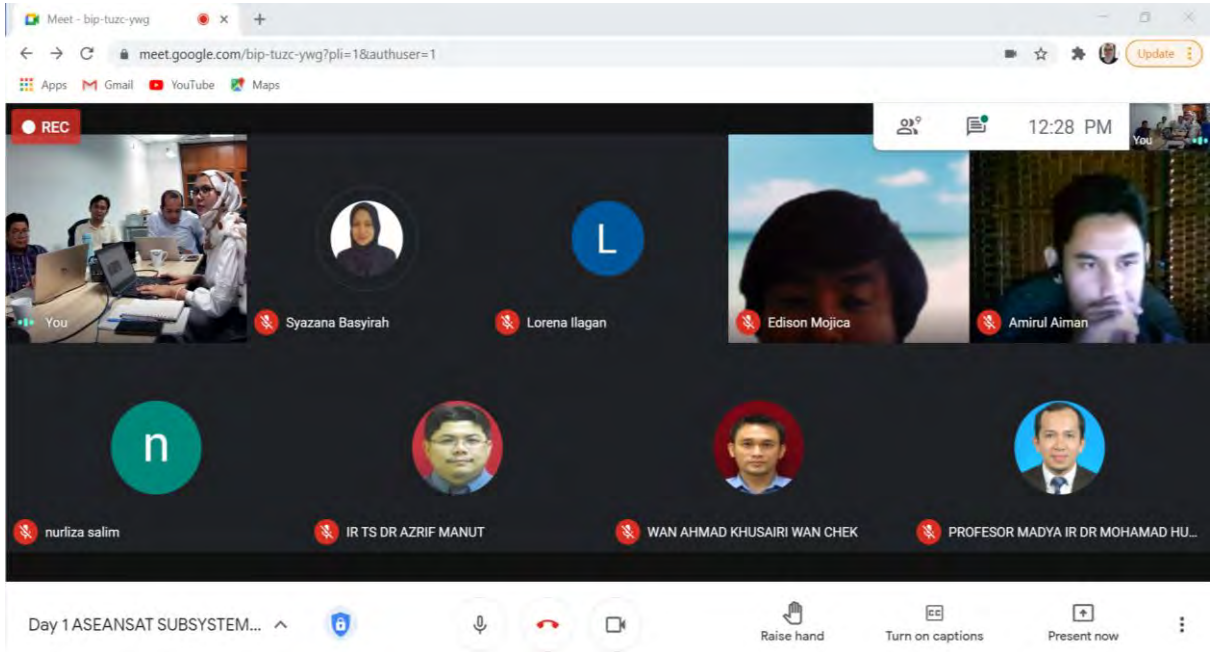
The research grant project of Universiti Teknologi MARA (UiTM) on development of flight model (FM) of 1U-sized CubeSat with high ground resolution camera payload, was officially commenced on February 1st, 2021. The date was based on the signed agreement between UiTM as the grant recipient with Ministry of Science, Technology and Innovation (MOSTI) as the funder. The research grant project is called as ASEANSAT Project since it is the multination collaboration project between Malaysia (represented by UiTM), Thailand (represented by King Mongkut's University of Technology North Bangkok (KMUTNB)), and Philippines (represented by University of Perpetual Help System DALTA (UPHSD)).

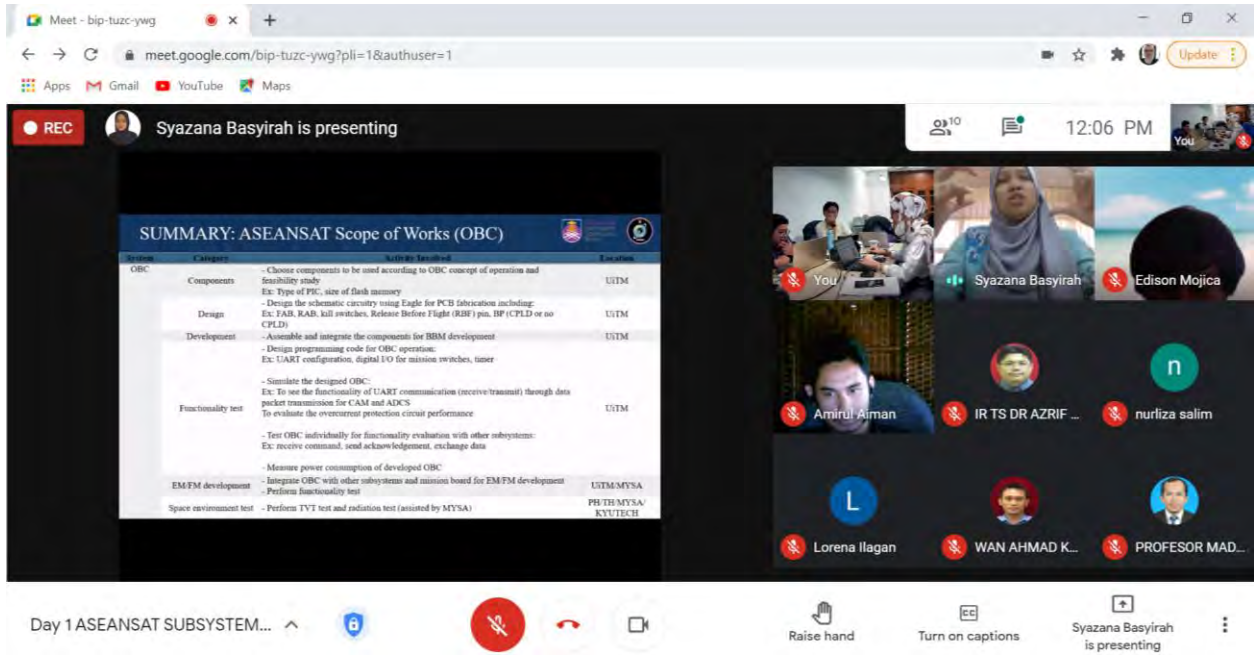
Like other Nanosatellite development projects, ASEANSAT project begins with team members organization and management for work breakdown structure development and mission analysis.



This was achieved by implementing the 3-day ASEANSAT Subsystem Training on March 8th, 12th, and 16th, 2021. See the above figure for the sample of training schedule. Only team members who are involved in technical aspect in developing the Nanosatellite participated. This training was essential in preparing and exposing the team members with the information on the sub-systems, mission systems, and structure that will be built for the 1U Nanosatellite.

The training started with the ice-breaking session where the team members of project were required to briefly





introduce themselves and present their related experience to the project. Based on the field of expertise of the team members, the mission and subsystems were assigned accordingly. This was where the work breakdown structure was developed.

Based on the screenshots above, the training was conducted through online platform via Google Meet application. The screenshots were taken during the first day training on March 8th, 2021. The training was divided into subsystems and mission systems in order to ensure the team members of the technical area understand and grasp the ideas for satellite development processes.

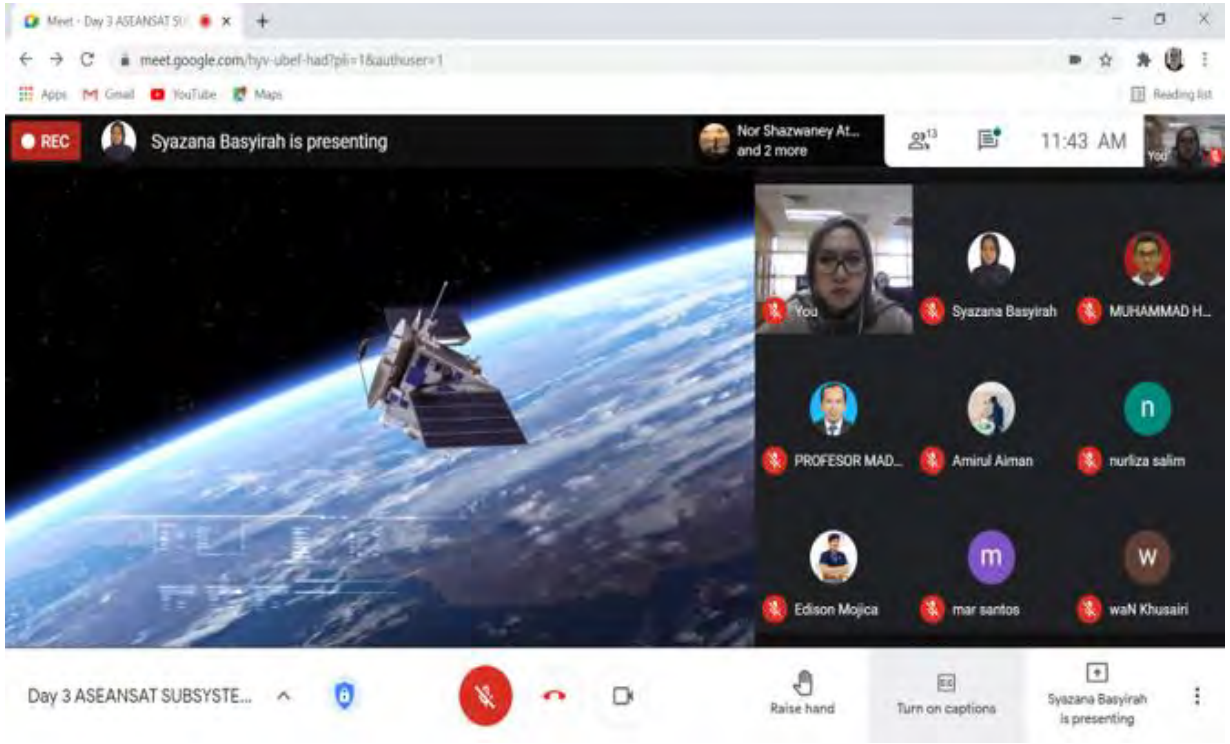


Figure above shows the participants of the training including the presenters on the right side while on the left side was the video showing about the Nanosatellite development process. The video was one of the interactive methods of learning in summarizing the full concept of Nanosatellite development.

The presenters of the training were Dr Mohamad Huzaimy, the Principal Investigator of the project, Dr Syazana Basyirah, the Project Leader and Fatimah Zaharah, the Project Manager. The training was also joined by the Project's Subsystem Verification Manager, Muhammad Hasif Azami and Operation and Financial Coordinator, Dr Azrif Manut.

After the completion of the training, the mission and subsystem of 1U Nanosatellite were assigned to the technical team members and discussed accordingly. There are eight (8) members of technical team for the project. The team has started their responsibilities based on the presented scope of works during the training. The training also presented the initial mission analysis for the ASEANSAT project while the parameters verification will be done based on the research implemented by each of the technical members. The training will drive the team towards the next stage of Nanosatellite development which is the Mission Design Review (MDR). The event will be having two or three panels with space expertise for the assessment and evaluation before the next stage of development is proceeded.

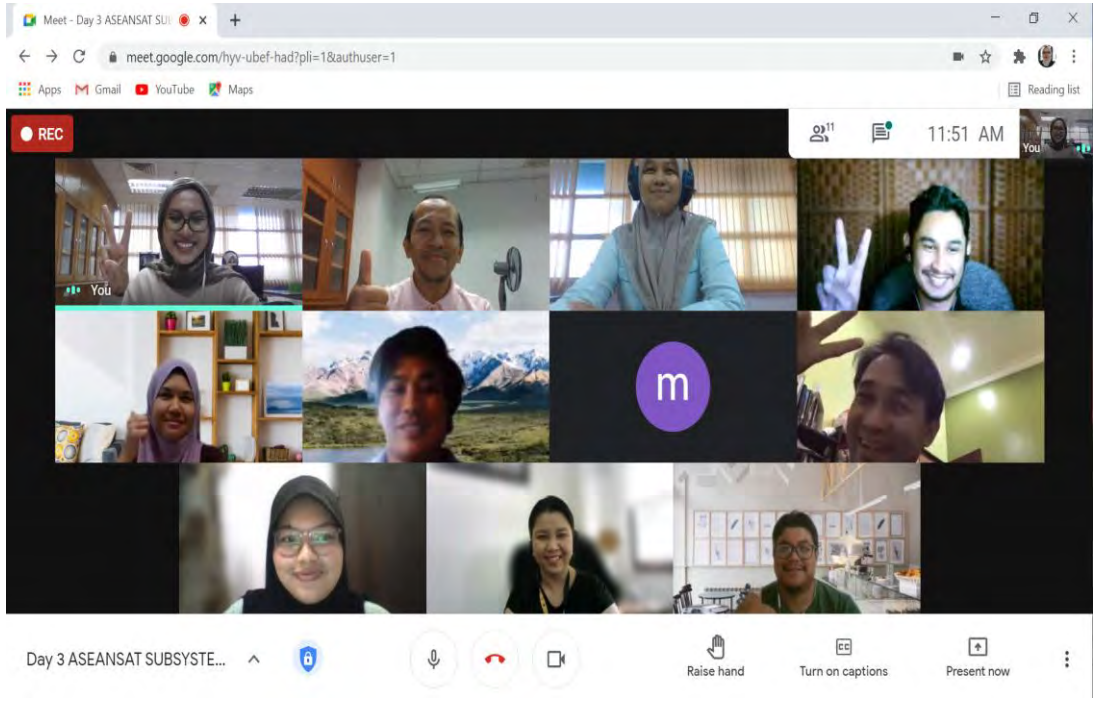


Figure on the left shows the happy faces of the participants after the end of the ASEANSAT Subsystem Training.

End of Malaysia's Column

16. Report from the Philippines

National Astronomy Week

February 18-20, 2021

STAMINA4Space members and colleagues from PhilSA were invited by different groups to present in events for the National Astronomy Week celebration. Dr. Maricor Soriano presented about how satellite technology improves the lives of Filipino People, STAMINA4Space researchers Kenneth Ibarra and Elaiza Pontrias presented about star identification research activities, and Dr. Atchong Hilario talked about optical payload technology.

PhilSA DDG and STAMINA4Space Advanced Satellite of the Philippines Project Leader Dr. Gay Jane Perez and PhilSA Research Specialist Shielo Muta also presented about current local space science and technology capabilities and activities in the Philippines.

Photos courtesy of RTU Astronomy Society (top), UP Astronomical Society (bottom left), Earth Shaker (bottom right)

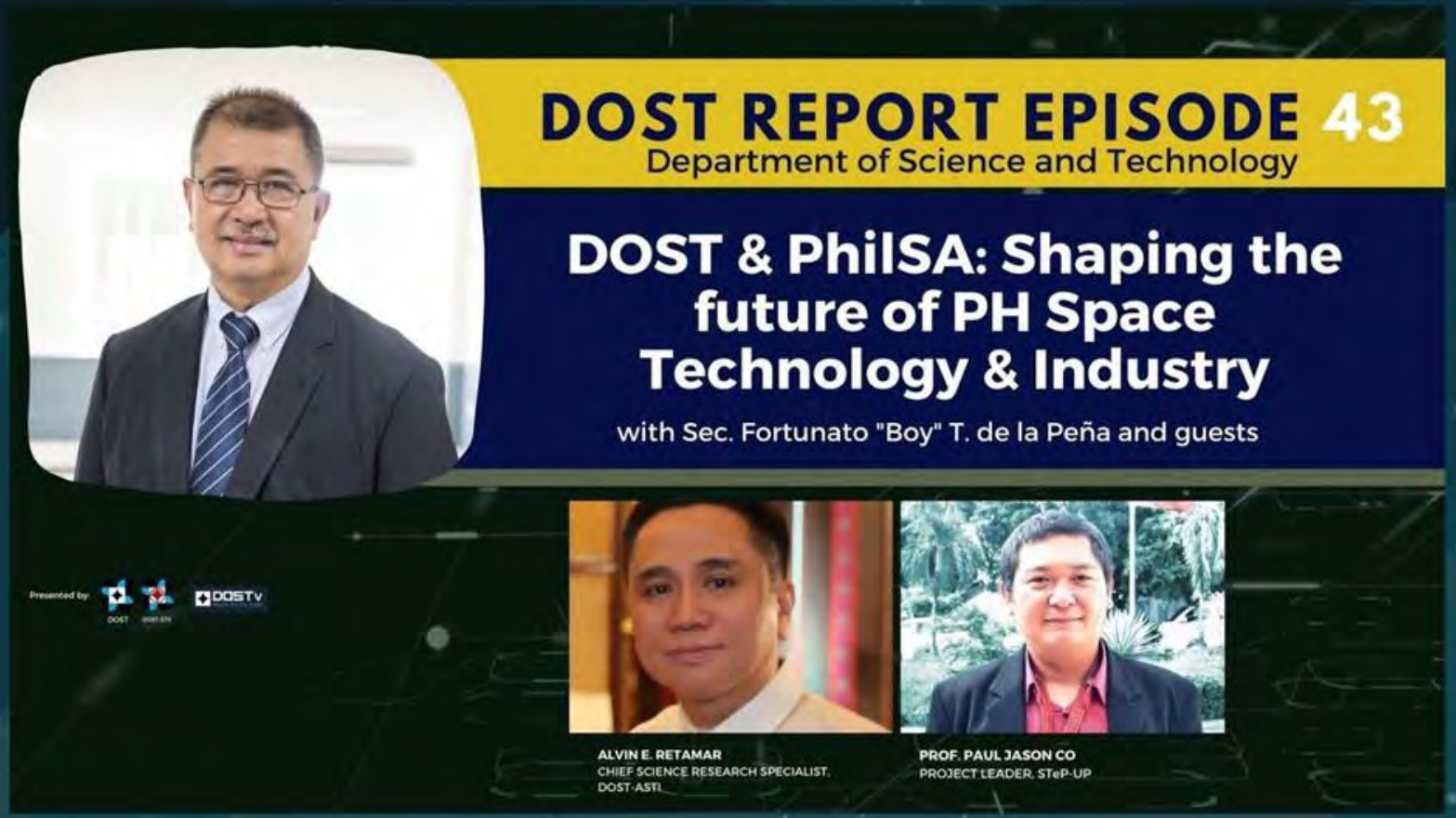
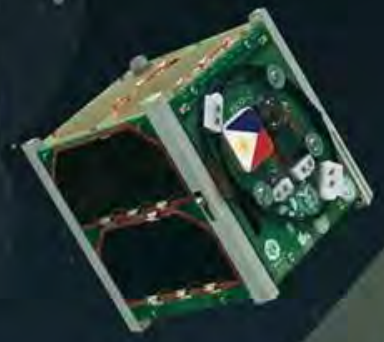


Photo courtesy of DOSTv

DOST Report Feature

February 19, 2021

DOST-Philippines Secretary Fortunato de la Peña and STAMINA4Space Project Leaders Engr. Alvin Retamar (GRASPED Project) and Prof. Paul Jason Co (STeP-UP Project) shared updates on the small satellites developed under the STAMINA4Space program and other local space and technology activities in the Philippines during an episode of the DOSTv Report.

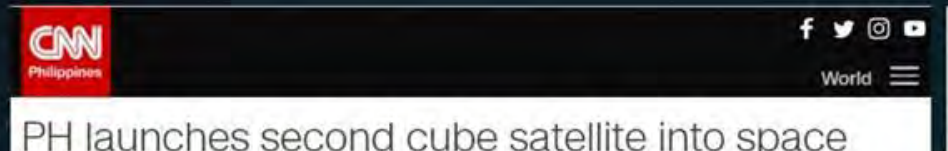


Maya-2 successful launch to ISS

February 21, 2020

The Philippines witnessed another historic moment as its second cube satellite (CubeSat) Maya-2 was successfully launched to the International Space Station (ISS) on February 21, 2021 at 1:36 A.M. (PHT) aboard the S.S. Katherine Johnson.

We also congratulate the BIRDS 4 Satellite Project - KyuTech and the teams behind their other cubesats, Tsuru (Japan) and GuaraniSat-1 (Paraguay) on the successful launch!


CNN Philippines

World

PH launches second cube satellite into space

By David Tristan Yumol, CNN Philippines

Published Feb 21, 2021 8:56:40 AM

MANILA BULLETIN

LATEST

PH's second nanosatellite Maya-2 'successfully' launched into space – DOST


BM

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Maya-2, PHL's 2nd cube satellite, launched

By LYN RESURRECCION | FEBRUARY 22, 2021


SATELLITES

Philippines' second cube satellite Maya-2 launched

FEB 22, 2021 4:02 PM PHT

GELO GONZALES


philstar GLOBAL

Philippines cube satellite Maya-2 launched into ISS

Rainier Allan Ronda (The Philippine Star) - February 22, 2021 - 12:00am


The Manila Times

News > Top Stories > Nation

PH launches nanosatellite Maya-2 into space

By Keith Calayag February 22, 2021 104


ABS-CBN NEWS

Philippines' 2nd cube satellite Maya-2 launched into space


Republic of the Philippines

PNA

PHILIPPINE NEWS AGENCY

PH's Maya-2 launched into space: DOST

By Ma. Cristina Arayata February 21, 2021, 5:33 pm


INQUIRER.NET

SPACE

Second nanosatellite made by Filipinos launched to space

By: Nitha V. Gano

National Astronomy Week

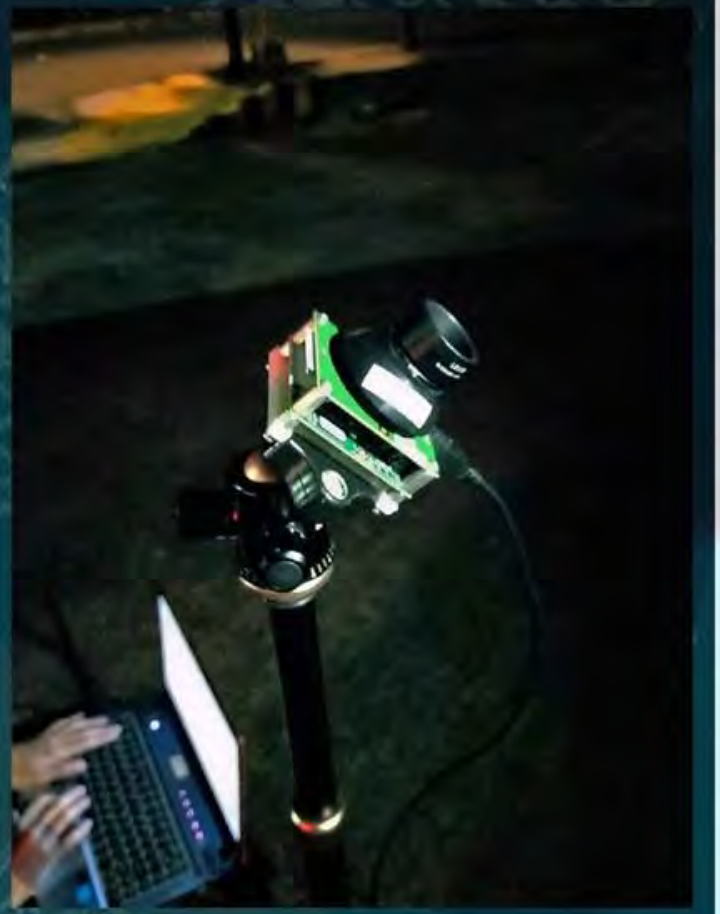
We capped off National Astronomy Week 2021 with another bit of trivia!

Did you know that we can capture photos of stars from the ground? Shown here is a local star camera system set up by researchers from our Building PHL-50: Localizing the Diwata-1, 2 Bus System as the Country's Space Heritage 50 kg Microsatellite Bus (PHL-50) Project, with the help of our Optical Payload Technology, In-depth Knowledge Acquisition, and Localization (OPTIKAL) project.

Read more here: https://bit.ly/3qm3NZo

More on our Star Tracker Telescope (STT): https://bit.ly/3qEbvhP

In Photos: (Right) STAMINA4Space researchers Kenneth Ibarra and Elaiza Pontrias manning the star camera system at the UP Diliman College of Science Grounds last year. The campus' relatively low light pollution at night makes it an ideal location for our researchers to do star trials. (Left) The star camera system set up at the UP Diliman College of Science grounds in Quezon City.



Filipinos in Space

February 24, 2020

The three Filipino-American engineers working with the team behind NASA's Perseverance Mars Rover met with the Maya-2 Engineers of the BIRDS 4 Satellite Project - KyuTech, STAMINA4Space Program, Philippine Space Agency, and the 2019 & 2020 NASA Space Apps Philippines winners and finalists.

Engr. Villar visited the Electrical and Electronics Engineering Institute in the University of the Philippines Diliman back in 2016. He was able to give a talk to the students and professionals on his experience while he was working with the Mars Curiosity team. He covered his journey of the first nuclear-powered rover from the launch, up to the everyday operations, data gathering and analysis, and monitoring of the Curiosity. His talk was entitled "Moving the Joystick: What it really takes to operate a rover on Mars".

More on the talk here:
bit.ly/3vkMzyv

Gregorio Villar III
EDL *(Entry, Descent, and Landing)* Systems Engineer

Genevie Yang
Science Planner, Sequence Integration Engineer, & Data Management Engineer

Edward Gonzales
Electromagnetic Compatibility Engineer

Asian Scientist Feature: Dr. Gay Jane Perez

February 24, 2020

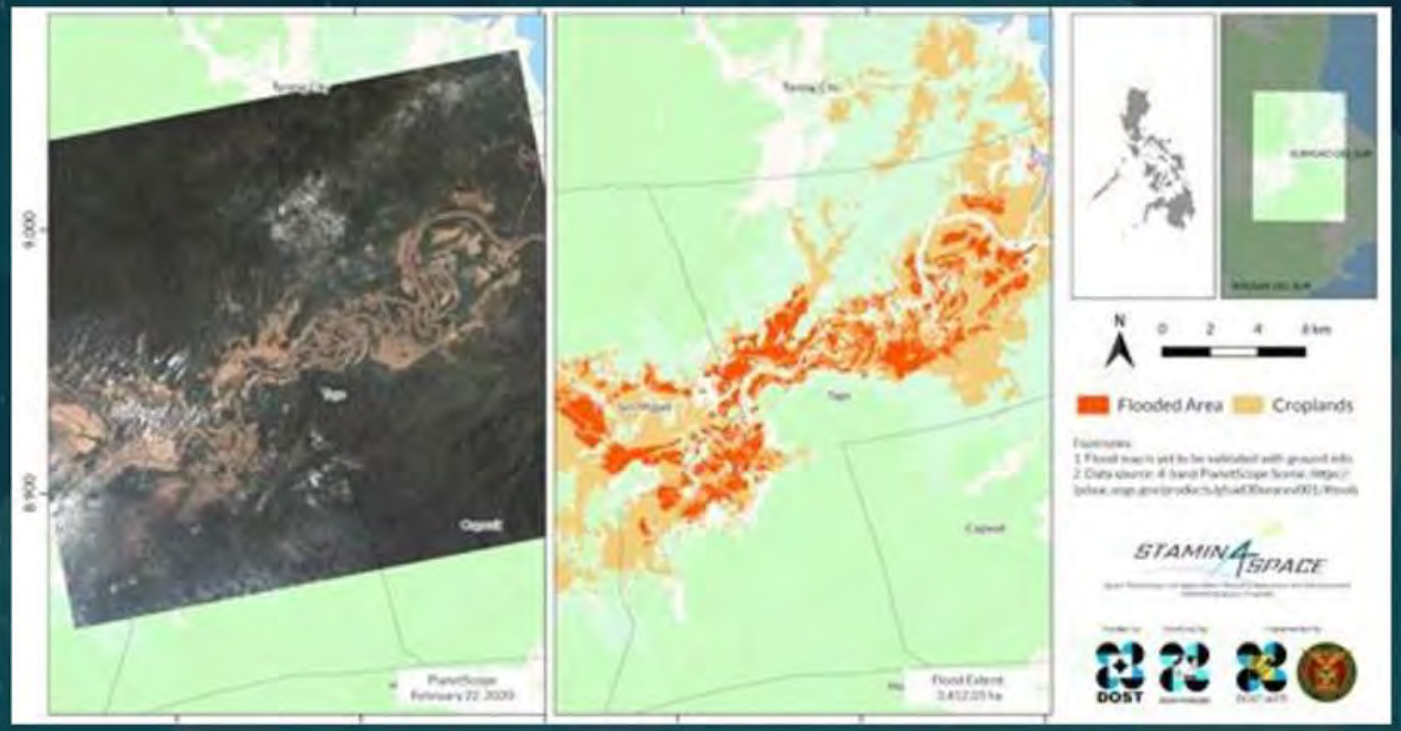
"'Looking at the Philippines through satellite images, I saw that there really is a relationship between temperature and vegetation,' said Perez, upon becoming the first Filipino to win the ASEAN-US Science Prize for Women in 2018. 'I was at NASA [NASA - National Aeronautics and Space Administration] in 2010, while we were having El Niño in the country.'"

Dr. Gay Jane Perez is the Project Leader of our Advanced Satellite for the Philippines (ASP) Project and the Deputy Director-General of the Philippine Space Agency.

Read the full article from Asian Scientist Magazine here: https://bit.ly/38xVNO0

Photo courtesy of Asian Scientist Magazine

Tropical Storm Auring February 26, 2020



This image shows a portion of Surigao del Sur after Severe Tropical Storm Auring *(international name: Dujuan)* where approximately 3,168 hectares of croplands in San Miguel and Tago, Surigao del Sur, were flooded. STAMINA4Space researchers made an assessment of the said areas using Normalized Difference Water Index (NDWI) and 3-meter resolution images captured by PlanetScope on February 22, 2021.

Read the full article on our website: https://bit.ly/3eCT61A

International Women's Day 2021

Happy International Women's Day to all women around the world!

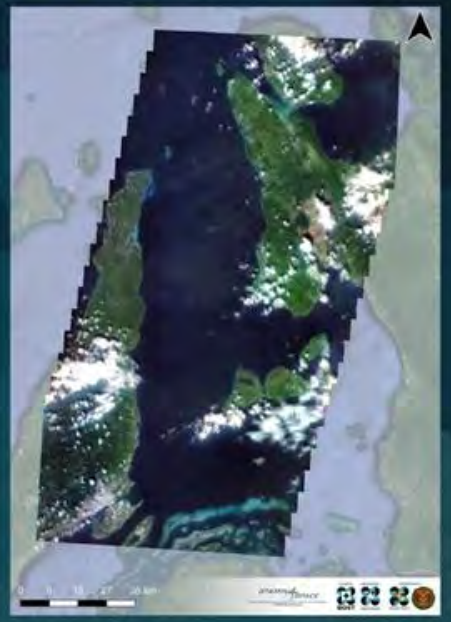
We put the spotlight on women and the priceless academic, economic, and domestic contributions they give to society each day. We strive to #ChooseTheChallenge by continuing to nurture a gender-balanced workforce, and hopefully, in the process, inspire more Filipinas to soar in whatever field they choose—even all the way to space.We are grateful to be part of a supportive and growing space community that enables us to pursue this.

World Wildlife Day 2021

March 3, 2020

To celebrate our country's rich wildlife, we share some images from Luzon, Visayas, and Mindanao and what kind of wildlife we we can find in them. These images were captured by Diwata-2, which is an Earth Observation microsatellite that carries cameras that can capture images of Earth for different environmental applications.

More details here:
https://bit.ly/3eMezFF



Maya-2 Release from the ISS into orbit

March 14, 2020

Maya-2, a cube satellite (CubeSat) made by Filipino engineers studying in Japan, was released to space from the International Space Station (ISS) on March 14 at around 7:20p.m. PHT. This latest development follows the CubeSat's launch to the space station aboard a Cygnus NG-15 rocket (S.S. Katherine Johnson) on February 21, 2021, together with CubeSats Tsuru (Japan) and GuaraniSat-1 (Paraguay).

We congratulate the whole BIRDS-4 team for this milestone!


STAMIN4SPACE
PHL MICROSAT
Updates from
STEP-UP
scholars
"The 17th step..."
March 2021
University of the Philippines- Diliman
Quezon City, Philippines
Prepared by STeP-UP scholars
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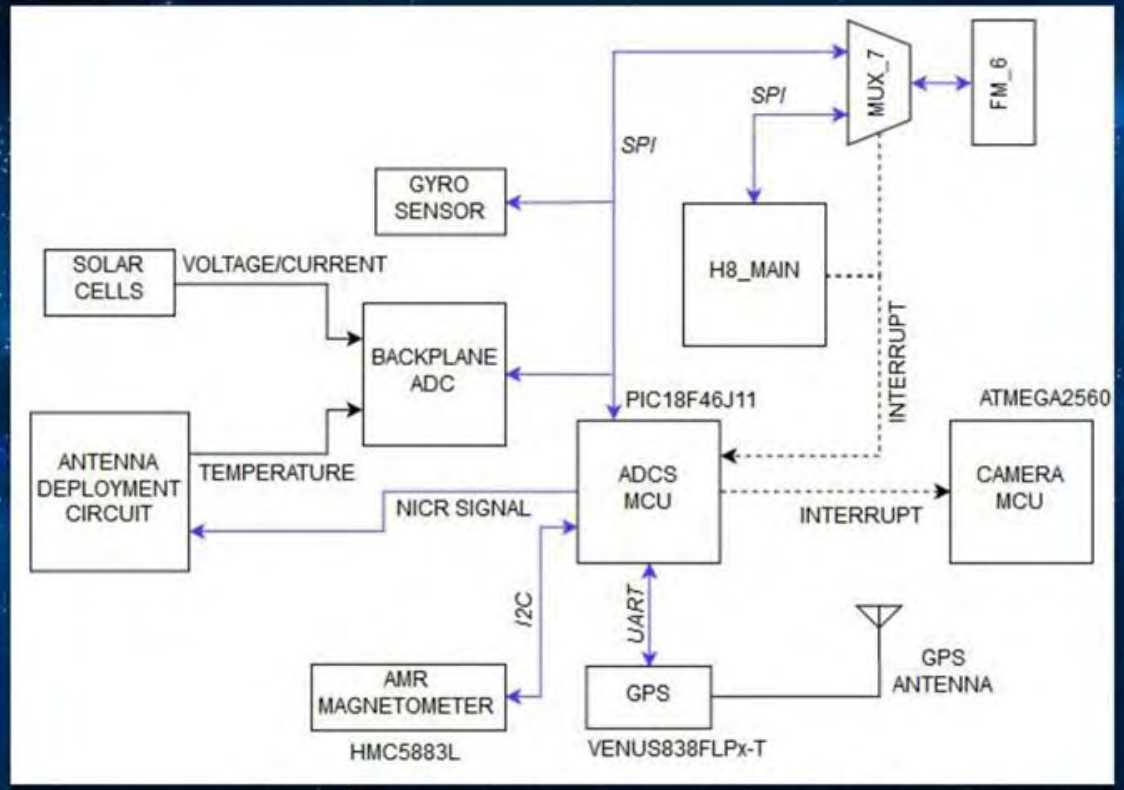
Attitude Determination and Control Subsystem

Derick Canceran

One of the subsystems that form the bus of the Maya-3 and Maya-4 CubeSats is the Attitude Determination and Control Subsystem (ADCS). A satellite's attitude can be simply described as its orientation relative to some reference frame. For the said CubeSats, the ADCS performs the collection of data from different sensors, estimation of the attitude, and passive stabilization of the CubeSat.

At the heart of the ADCS is a PIC18 8-bit microcontroller. Connected to it are sensors such as the gyroscope that measures rotation rates, magnetometer that measures the magnetic field, and solar cells that are used for coarse sun sensing. A GPS receiver is also connected to obtain location and time information.

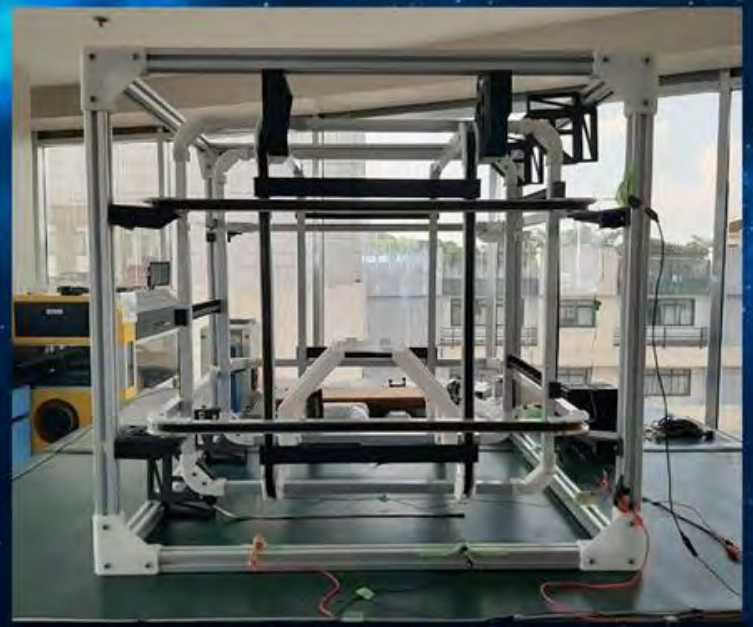
The different sensor data are translated into vector information, which is then used in attitude estimation. The TRIAD algorithm is used to estimate the CubeSat attitude.



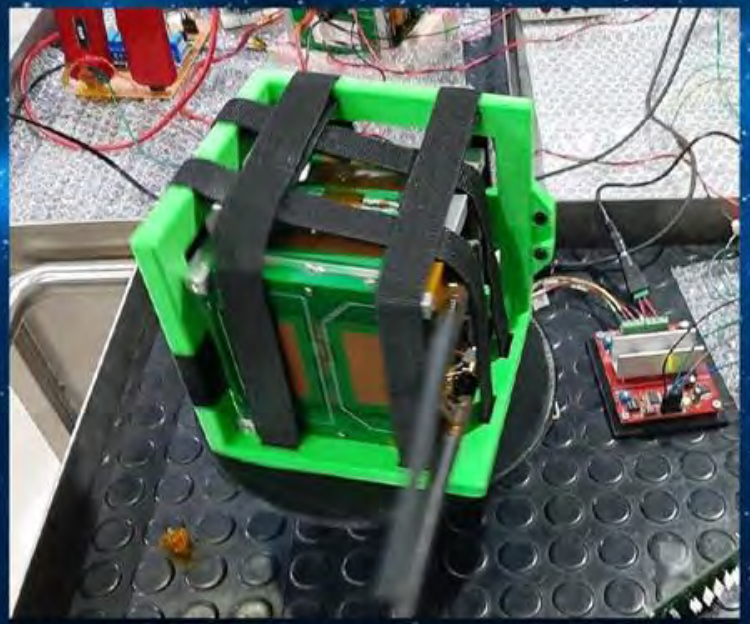
Block diagram of the Maya-3 and Maya-4 ADCS

Attitude Determination and Control Subsystem

To obtain meaningful data from the different sensors, it is imperative that their output are calibrated and validated.



Helmholtz cage at the ULyS^{3}ES used for characterizing the magnetometer

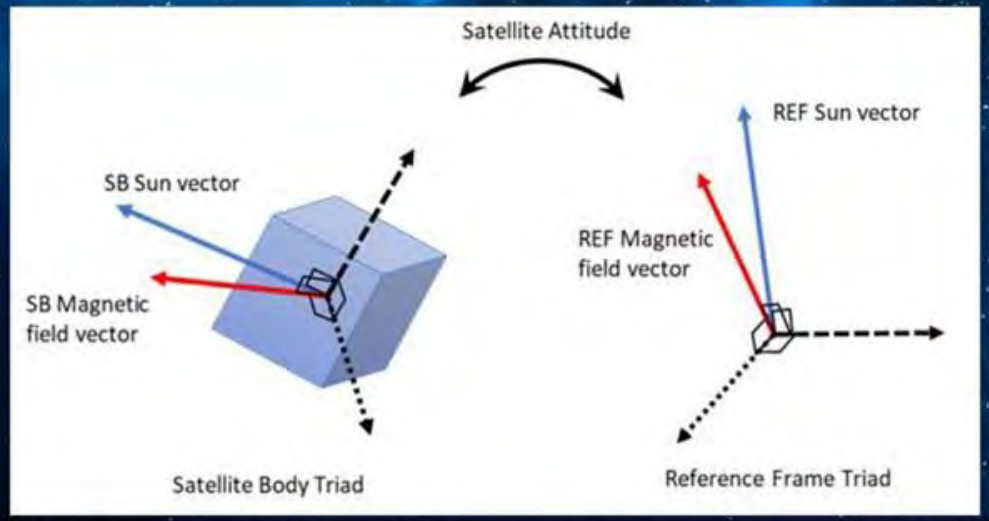


Maya-3 EM mounted on rotating platform for characterization of gyroscope

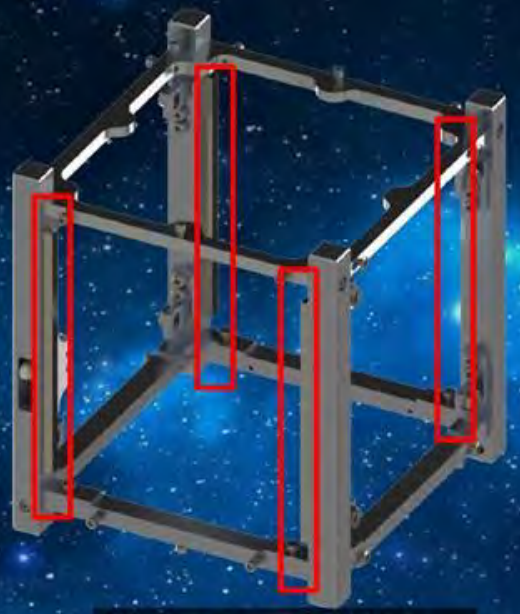
Testing and characterization of solar panel boards using a solar simulator at KyuTech

Attitude Determination and Control Subsystem

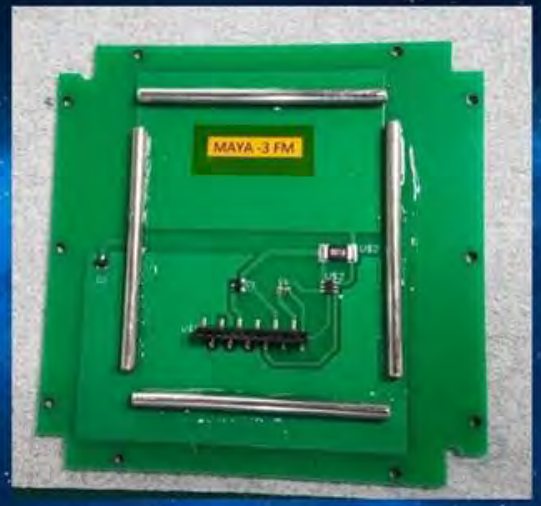
Data from the sensors are processed and a satellite body triad is calculated. External reference data (simplified sun ephemeris and earth magnetic dipole models) are used to make a reference triad. The difference between the two triads is the estimated attitude. In Maya-3 and Maya-4, the attitude is represented by direction cosine matrices. These are saved in memory in 32-bit IEEE float format, which can be downloaded by the ground station.



Demonstration of the TRIAD algorithm. A satellite body triad is compared with a reference triad. The rotation between the two is the estimated attitude of the satellite.



Permanent magnets



Hysteresis rods

Passive detumbling of the CubeSats is done using permanent magnets (made of AlNiCo) and hysteresis rods (made of HyMu80). The magnets and rods are mounted orthogonally within the satellite. These magnetic materials tend to align to the earth's local magnetic field and dampen the oscillations in the attitude.

BIRDS' EYE

UPDATES FROM STEP-UP BATCH 2

March 15, 2021
University of the Philippines, Diliman
Quezon City, Philippines

Khazmir Camille Valerie Macaraeg
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Graphic Artist | Contributing Writer

Chandler Timm Doloriel
Contributing Writer

Ronald Collamar
Contributing Writer

Joseph Jonathan Co
Contributing Writer

Comms team assembling the CubeSat for radiation pattern measurement

Sensitivity test setup in the Full Anechoic Chamber (FAC)

JJ sending "uplink messages" to setup inside the FAC

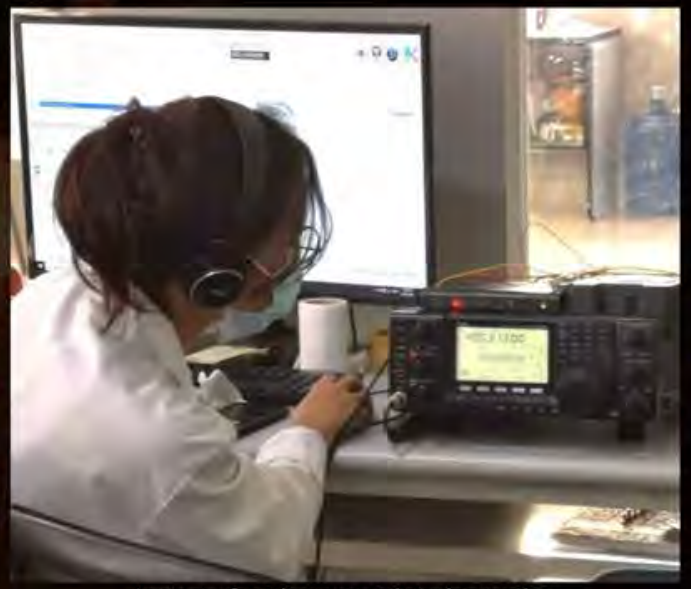
STAMIN4SPACE STeP-UP PROJECT

For the past month, the Communications Team has been conducting tests and measurements in their respective missions/subsystems.

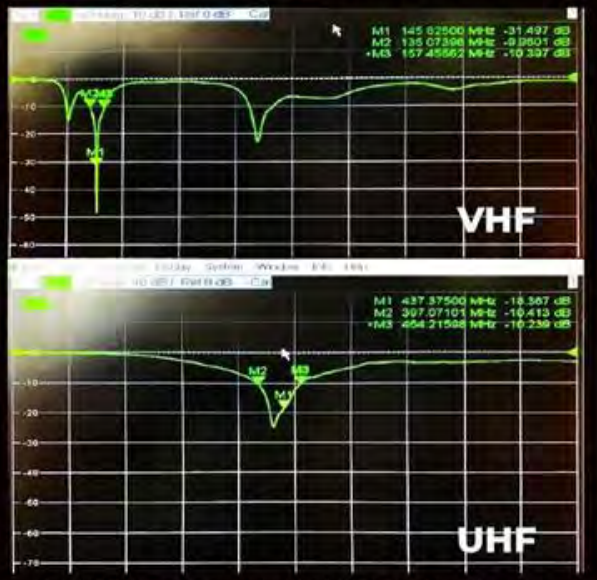
Val conducted tuning, S11, and radiation pattern measurement of the dipole antennas, and Anna and JJ conducted functionality tests and are currently conducting sensitivity tests for the COM subsystem and APRS mission.

COMMS TEAM TESTS

Val strapping in the cubesat onto the L-Bracket for radiation pattern measurement



Anna performing ground station tuning

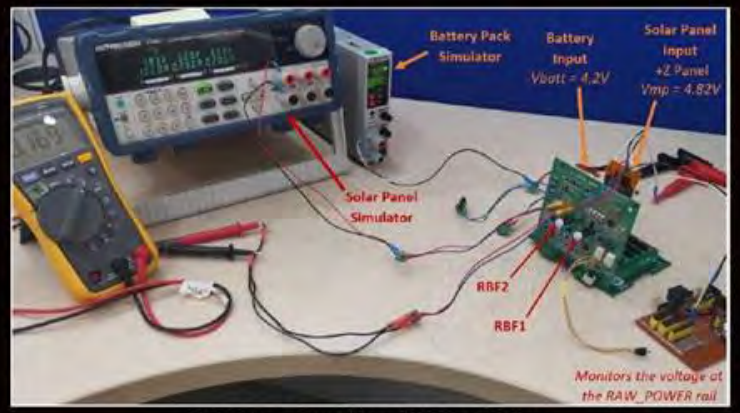


Initial S11 measurements of the dipole antennas

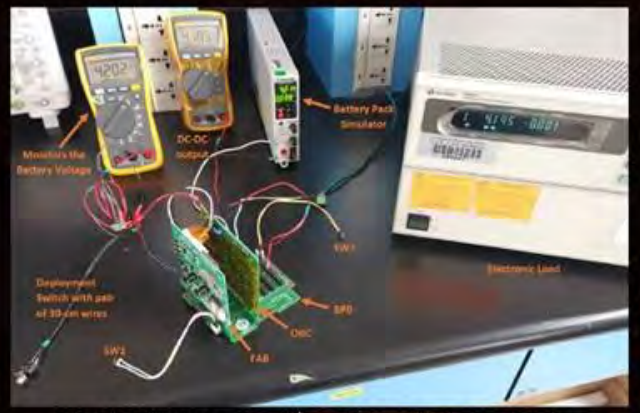
EPS SUBSYSTEM TESTS

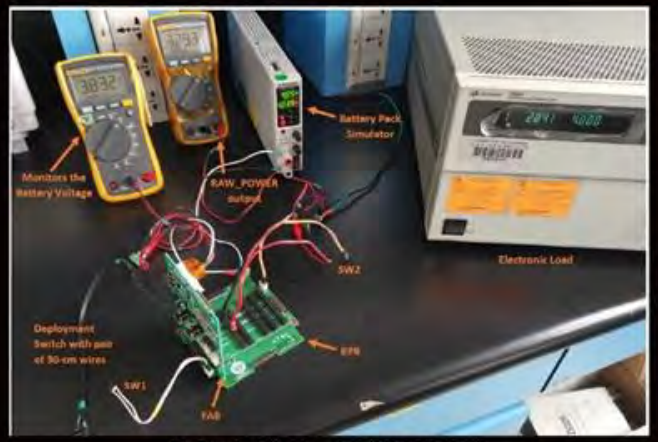
The Electric Power System, like the rest of the other missions/subsystems, underwent multiple tests as well.

These include the functionality tests of the deployment switches and RBF pins, simulation of battery discharge, and sensitivity testing of the over-current protection system

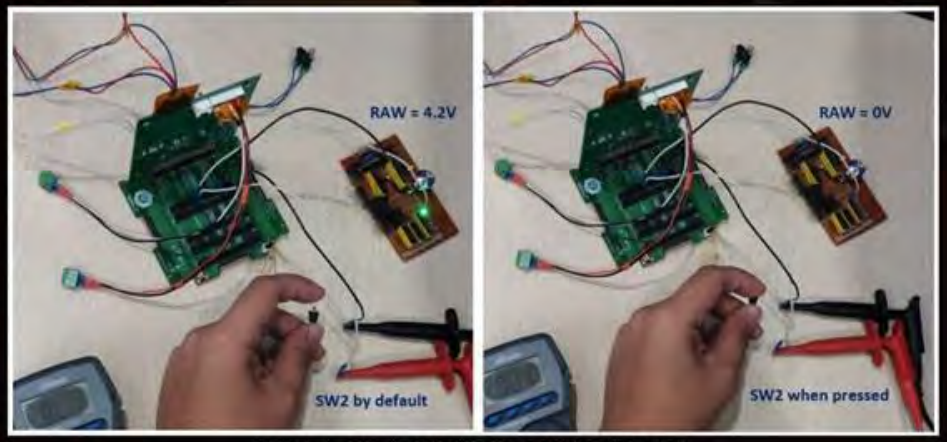


RBF Pins Functionality Test Setup


DC-DC Efficiency Test / OCP Sensitivity Test Setup



Battery Discharge Simulation



Deployment Switches Functionality Test

STAMINA SPACE STeP-UP PROJECT

Batch 2 would like to congratulate our teammate, Kuya Ronald, and his wife, Ate Marianne, for welcoming their first child last February 28. #TeamNoSleep

Welcome to the team, baby Xaxa!

NEWEST TEAM MEMBER

17. New column to be written in Spanish (Edition No.1)

This is a new column to be written in Spanish.

BPN=BIRDS Project Newsletter

The columnist is Fátima Durán. She is an SEIC/PNST student from El Salvador who started at Kyutech in Fall of 2020. We have selected Spanish for this column because increasingly many readers of BPN (BIRDS Project Newsletter) live and work in Spanish-speaking nations – such as Paraguay, El Salvador, Honduras, Costa Rica, and so on.

You can find her self-introduction (in English) here: Pages 8 – 15, of Issue No.53, BPN.

BPN ESPAÑOL

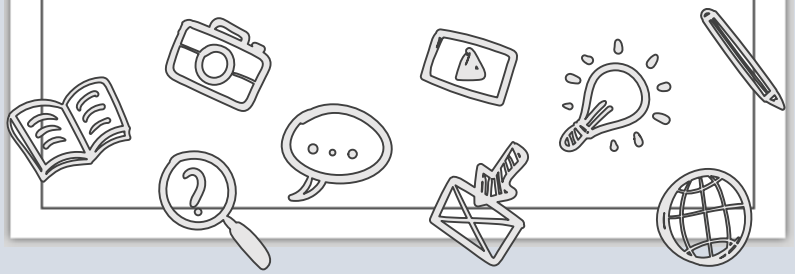
-FIRST EDITION-

Written by

Fatima Duran

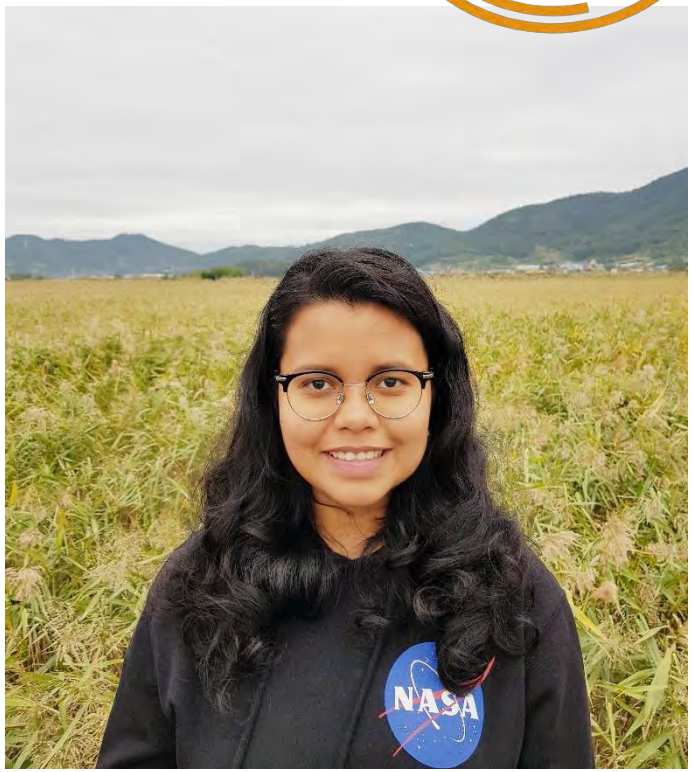
El Salvador

SEIC/PNST student



¡Bienvenid@s!

¡Hola! ¡Bienvenid@s a la primera edición de “**BPN Español**”! Mi nombre es Fátima Durán, y es un orgullo para mí poder compartir en esta columna diferentes temas de interés tanto sobre estudios, investigación, y también sobre el estilo vida en Japón. En esta edición, les daré una breve presentación personal sobre mí.



Soy salvadoreña y actualmente soy estudiante de maestría en Ingeniería de Sistemas Eléctricos y Espaciales, del programa “Curso Internacional de Ingeniería Espacial” (**SEIC**, por sus siglas en inglés). Esto es gracias al programa de becas “Estudios de posgrado en tecnología de nanosatélites” (**PNST**, por sus siglas en inglés).

Durante una práctica de laboratorio sobre dinámica de vuelo, en Pusan National University.

*Antes de llegar a **KYUTECH**…*

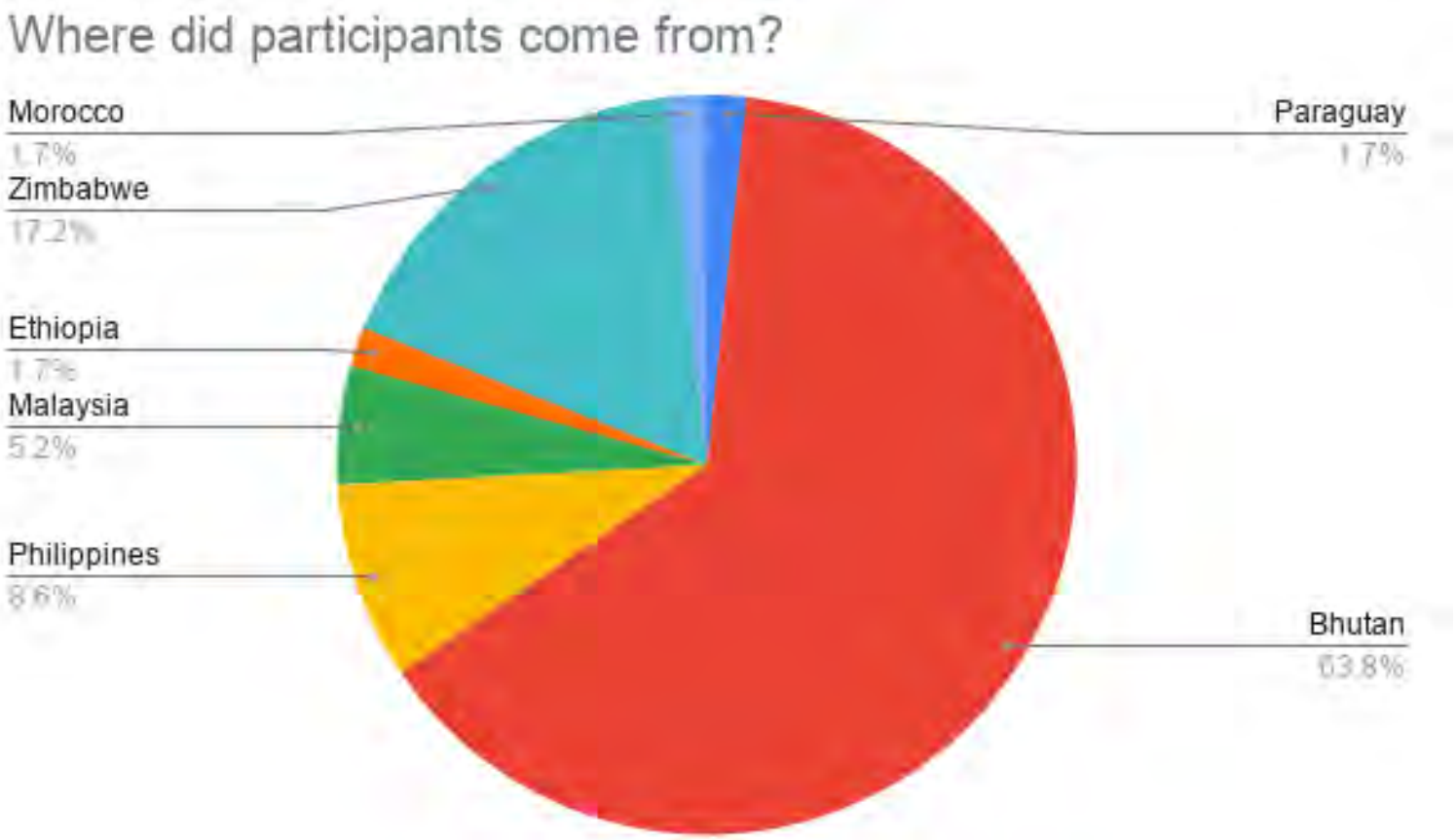
Anteriormente, estudié Técnico en Mantenimiento Aeronáutico en la Universidad Don Bosco (**UDB**), El Salvador. En el mismo año que concluía mis estudios en la UDB, me gané una beca del gobierno de Corea (programa de becas **GKS**, por sus siglas en inglés) y tuve la oportunidad de estudiar en Corea del Sur durante cinco años. Estudié coreano durante un año en Ewha Womens University, en Seúl, y luego me trasladé a Pusan National University (**PNU**), en Busan, para realizar mis estudios de pregrado en Ingeniería Aeroespacial. Ahora, en este nueva etapa, espero conocer y aprender muchísimo de Ingeniería Espacial, mis profesores y compañer@s de todas partes del mundo.

¡Graduación! (Febrero, 2020)

GST Column
Sixth Issue:
"GST Workshop 2021"

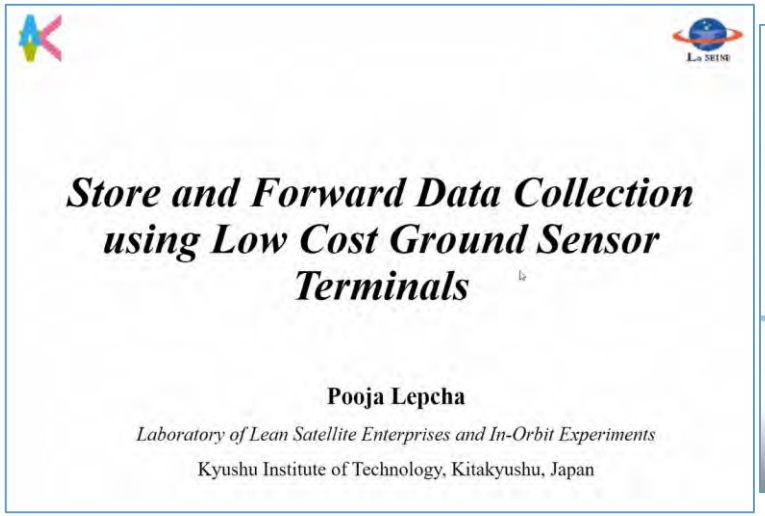
by *Pooja Lepcha*
Phd candidate, Bhutan
15 March 2021

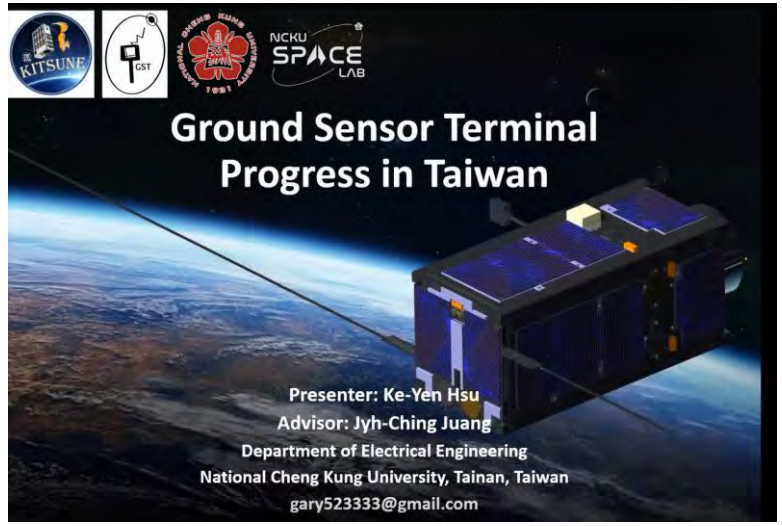
Highlights

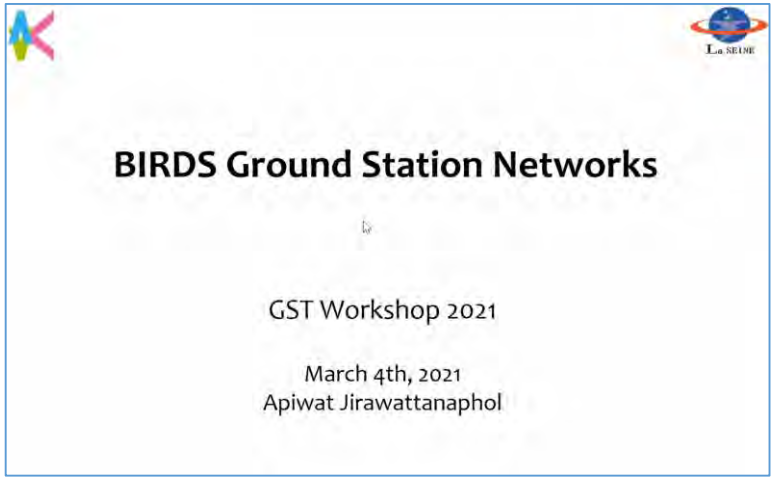


- GST Workshop was held on 4th March 2021 virtually via ZOOM. Although it started from 21:00 JST we had about 99 members attending the workshop at a point in time.
- There were 61 registrations on the online form apart from LASEINE members.

Presentations







Presentations

Portable Ground Station Terminal Development

Galbayar Lkhagvasuren
National University of Mongolia
Nano satellite research laboratory

Special Mentions:

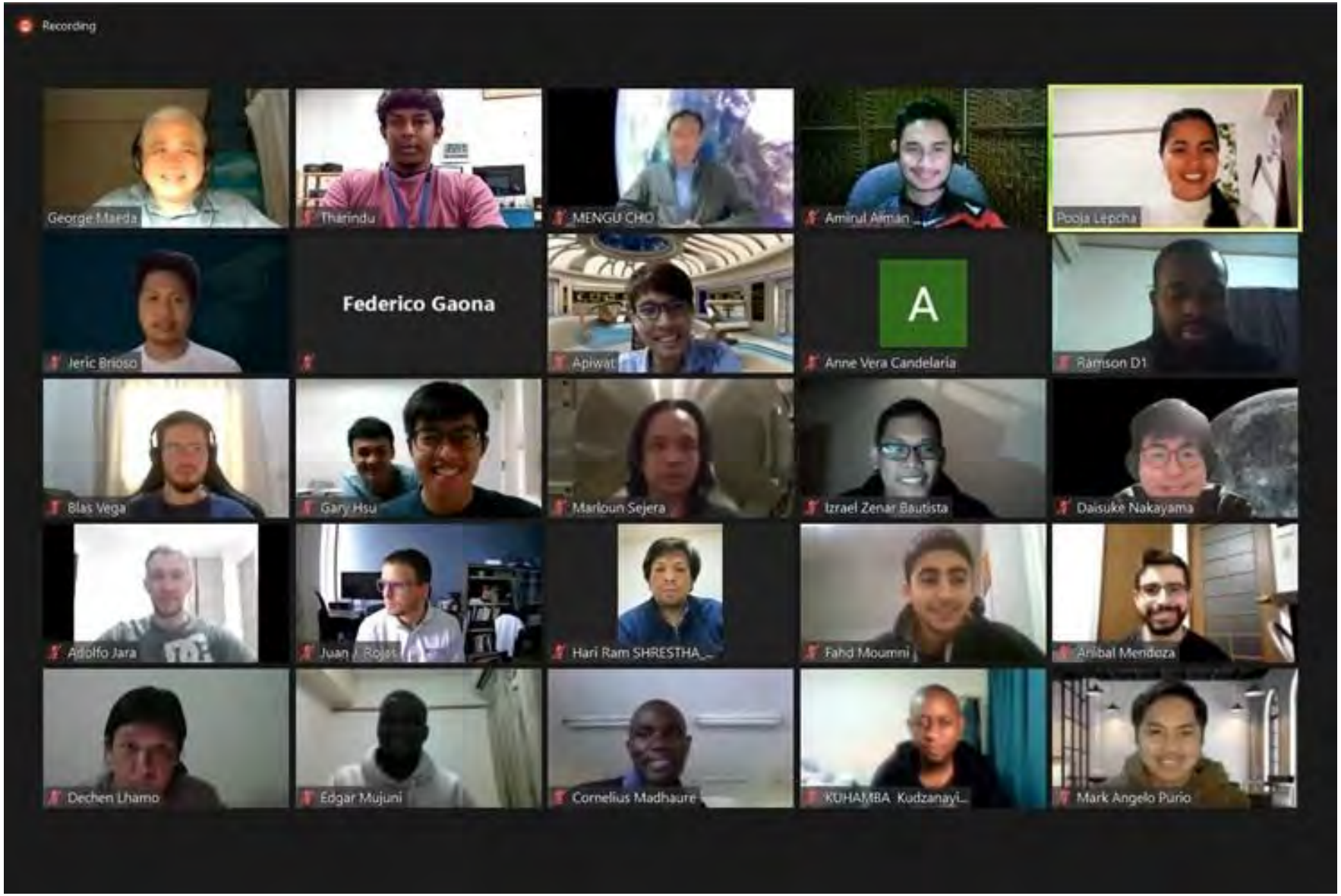
I thank Cho sensei for giving the opening remarks and also the closing remarks.

I thank Maeda sensei for being the moderator and keeping the program on track.

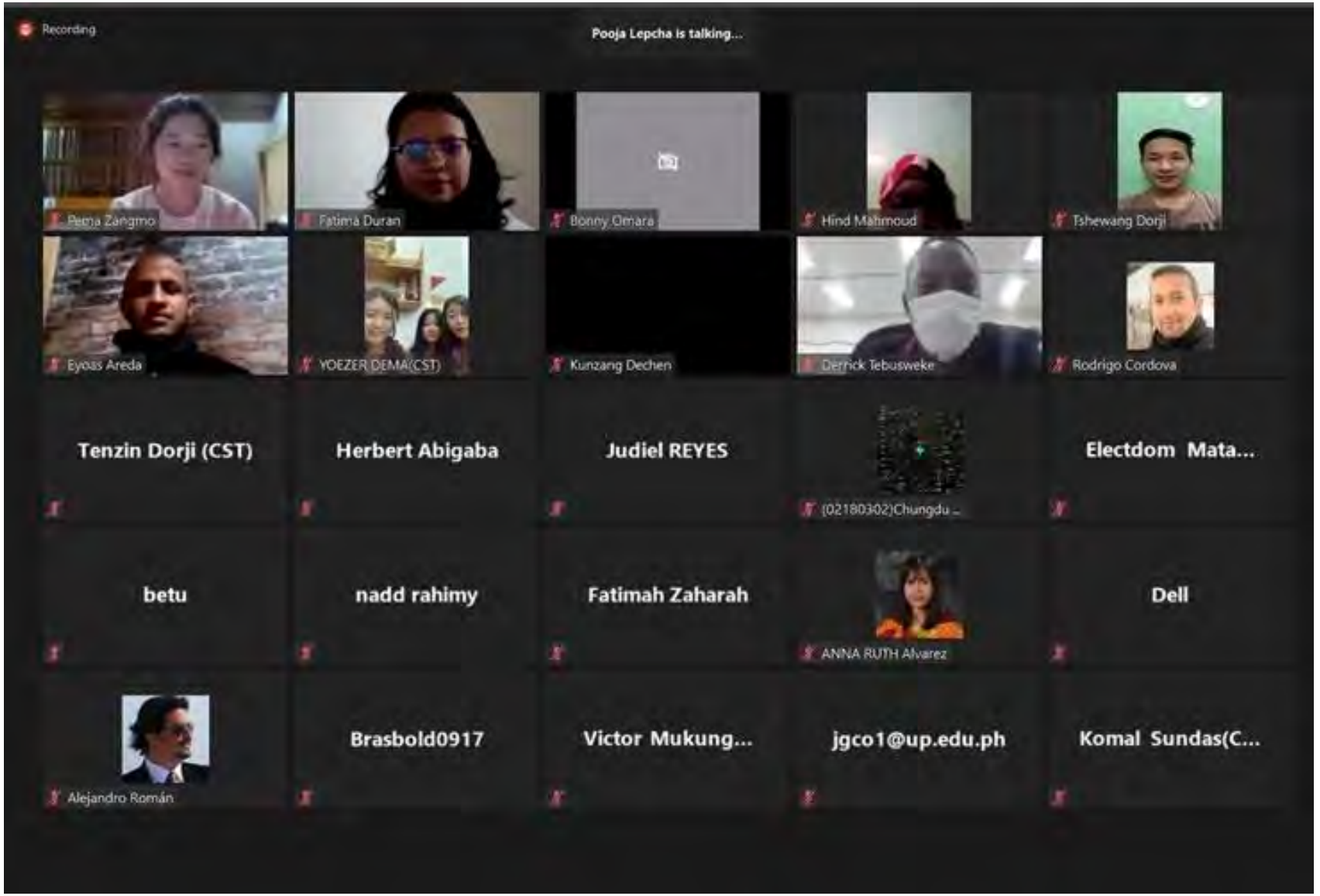
Key Discussion Points

- All GST builders presented their progress in developing their GST.
- All GST builders confirmed that they can build GST before the launch of KITSUNE and will participate in the store and forward data collection mission.
- All GST builders also will look into their frequency regulations for operating LoRa and confirm the maximum power uplink from GST
- All GST builders will receive GST PCB fabricated by Kyutech.
- GST builders will have a meeting online again to discuss about the progress and updates about the GSTs in respective countries before satellite launch.
- **The next GST workshop will be held in Bhutan and all the GST builders will be invited to attend and test their GSTs with the satellite in orbit.**

Participants photo sessions (1/3)



Participants photo sessions (2/3)



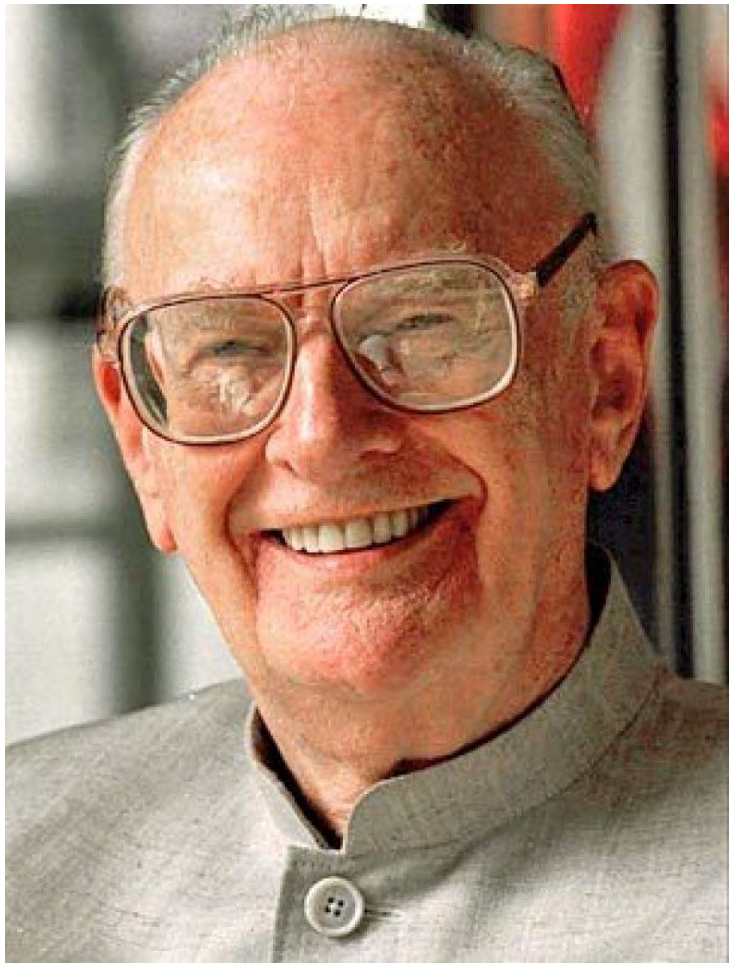
Participants photo sessions (3/3)

Thank you everyone for being part of this GST Workshop.

See you again at the next workshop!

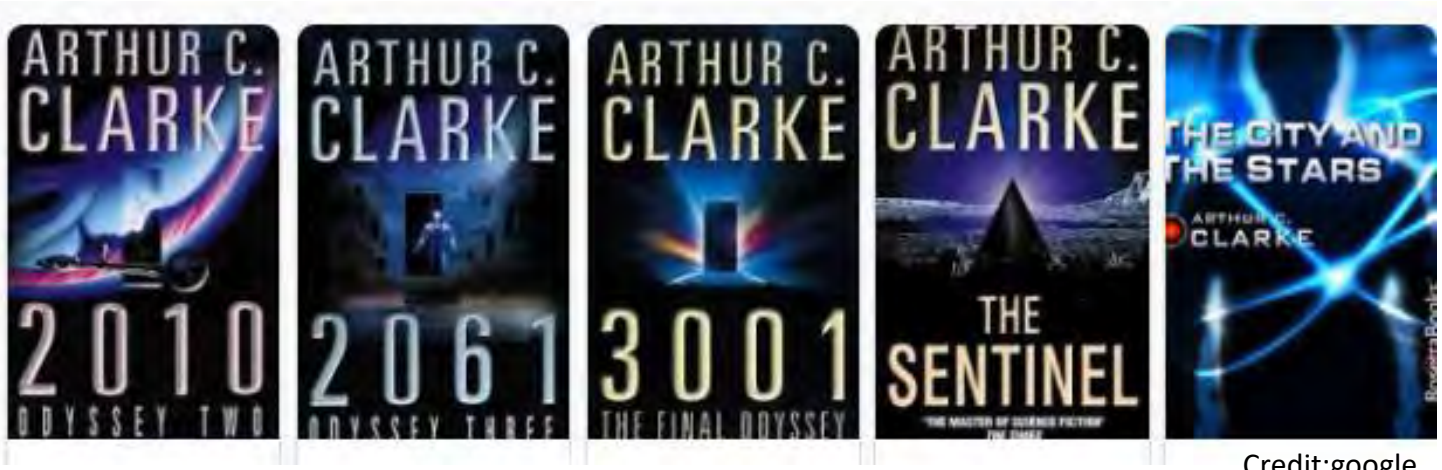
END OF COLUMN NO. 6

19. Quick notes about Sir Arthur C Clarke (name of ACCIMT comes from him)



Credit: Los Angeles Times

Sir Arthur C Clarke



Credit:google

By Dulani Chamika
Phd candidate, Sri Lanka
15 March 2021

Sir Arthur C Carke(1917-2008)

Arthur C Clarke Institute for Modern Technologies in Sri Lanka was named after founder patron , Sir Arthur C Clarke.

Sir Arthur C Clarke is best known as a English writer, science fiction writer, futurist, inventor and a undersea explorer .

Sir Arthur C Clarke was born in December 16, 1917 and died on March 19, 2008 in Sri Lanka. He emigrated to Sri Lanka in 1956 as he was interested in scuba diving. He was chairman of the British Interplanetary Society from 1946 to 1947 and from 1951 to 1953. Interplanetary Flight (1950) and The Exploration of Space (1951) are the first non fiction books he wrote.

Credit: Biography

2001: A Space Odyssey is (1968) which is science fiction film was produced and directed by Stanley Kubrick. The screenplay was written by Stanley Kubrick and Sir Arthur C Clarke. It was inspired by Sit Arthur C Clarke's 1951 short story “The Sentinel” and other short stories by Clarke (Wikipedia)

Sir Arthur C Clarke was the first to propose the concept of extra-terrestrial communication through geo-stationary satellites in 1945.

He was knighted in 1998 and he was awarded Sri Lanka's highest civil honour, Sri Lankabhimanya, in 2005 (Wikipedia). In honor of his work, the International Astronomical Union named the orbit which is 36,000 kilometers above the Earth's equator as the Clarke Orbit, and asteroid No. 4923 received the designation “Clarke. (biography.com)

Credit: Wikipedia

"Two possibilities exist: either we are alone in the Universe or we are not. Both are equally terrifying."

~ Sir Arthur C Clarke~

References for this article:

https://www.biography.com/writer/arthur-c-clarke
https://en.wikipedia.org/wiki/2001:_A_Space_Odyssey_(film)
https://en.wikipedia.org/wiki/Arthur_C._Clarke
https://www.britannica.com/biography/Arthur-C-Clarke

END

20. SEIC Guest Lecture Series of 2020-2021

During the 2020-2021 academic year at SEIC, we tried a new guest lecture format because we could not physically invite guest lecturers to Kyutech due to COVID-19. We tried the ZOOM approach. And SEIC management believes that this experiment was a notable success.

***However, it was a success because of the outstanding performances by Guest Lecturers*.**
We wish to thank each and everyone of them for educating and inspiring our SEIC students. The Guest Lecturers are presented on the following pages in chronological order. *---Editor.*

2020-2021 SEIC Guest Lecture speaker list

No.	Date of lecture, and Photo	Speaker	Country	Affiliation	Title
1	16 July 2020 	Garvey McIntosh	USA	NASA, Tokyo Office	How the commercialization of outer space will further accelerate the sustained human presence throughout our Solar System
2	4 Aug. 2020 	Amal Chandran	India	NTU (Singapore)	A Beginners Guide To Spacecraft Design
3	25 Aug. 2020 	Adolfo Chaves Jiménez	Costa Rica	Costa Rica Institute of Technology (TEC)	The impact of orbit and attitude coupling in the implementation of AOCS systems for spacecraft
4	4 Sept 2020 	Joel Joseph S. Marciano, Jr.	Philippines	The Philippine Space Agency	The Philippine Space Agency (PhilSA): Value Creation in Space Science, Technology and Applications (SSTA)

5	10 Sept 2020 	Jordan Vannitsen	France	ODYSSEUS Space	A NewSpace Overview
6	18 Sept 2020 	Werner Balogh	Austria	World Meteorological Organization	Space-related Activities of the World Meteorological Organization
7	30 Sept 2020 	Angel Flores-Abad	USA	Univ. of Texas at El Paso, Texas, USA	A CubeSat with Space Robotics Capabilities
8	14 Oct. 2020 	Taiwo Tejumola	Nigeria	International Space University, France	Navigating a Career in Space: How to Find a Space Job after SEIC
9	18 Oct.2020 	Dianne DeTurris	USA	Aerospace Engineering Department, Cal Poly, California, USA	Hypersonic Airbreathing Access to Space

10	24 Oct. 2020 	Juan José Rojas Hernández	Costa Rica	Costa Rica Institute of Technology (TEC)	Custom instrumentation for power system testing in lean satellites
11	18 Nov.2020 	Kevin C. Conole	USA	NASA HQ	United States Leadership at the United Nations Committee on the Peaceful Uses of Outer Space (UN COPUOS)
12	30 Nov 2020 	Loren Chang	Taiwan	National Central University (NCU), Taiwan	IDEASSat: A 3U CubeSat for Ionospheric Science and Capacity Building
13	8 Dec 2020 	Rowena Cristina L. Guevara	Philippines	Department of Science and Technology (DOST), Philippines	Space Science and Technology for Disaster Risk Reduction and Climate Change Adaptation in the Philippines
14	22 Dec 2020 	Apiwat Jirawattanaphol	Thailand	NBSpace (at KMUTNB)	Space business and space tech start-up company in Thailand

15	13 Jan 2021 	Hazuki Mori	Japan	Space Applications Section – UNOOSA	Looking at the space sector: from in and out of Japan
16	18 Jan 2021 	Kimiya Komurasaki	Japan	The University of Tokyo	"Microwave Rocket" as a future space launch system
17	01 Feb 2021 	Marco Gómez-Jenkins	Costa Rica	University of Cambridge, UK	Applications of Thermal Infrared Satellite Images
18	16 Feb 2021 	Takefumi Mitani	Japan	Institute of Space and Astronautical Science (ISAS), Japan Aerospace Exploration Agency (JAXA)	High-energy electron measurements in geospace
19	25 Feb 2021 	Yukiko Okumura	Japan	UNOOSA	The Legal Regime of Outer Space – An Overview of Fundamental Principles and Implementation

END OF THIS SECTION

21. Report from Paraguay

CApacity **BU**ilding in **RE**search & **I**nnovation For **S**pace

The "**CABURE+I 4S**" Project

Newsletter

News from Paraguay
March 2021

Contributors:
Members of
The CABURE+I 4S Project Team

Edited by:
Blas Vega

FIUNA FPUNA UNG

Paraguay Space Agency

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

Title: Institution’s Authorities on the deployment day

Contributors: AEP

On March 14, the Paraguay Space Agency (AEP) deployed the GuaraniSat-1 satellite from the International Space Station. The project was developed in collaboration with Asunción National University (UNA) and Kyutech University.

The deployment was celebrated with joy and enthusiasm at the university campus, in the UNA rector's presence, the Japan Ambassador in Paraguay, the AEP president, and the dean of Polytechnic Faculty.

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

Title: Institution’s Authorities on the deployment day

Contributors: AEP

Academia, government, and foreign representatives were present in this historical event.

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

Title: Asunción-Paraguay from the ISS

Contributors: NOGUCHI,

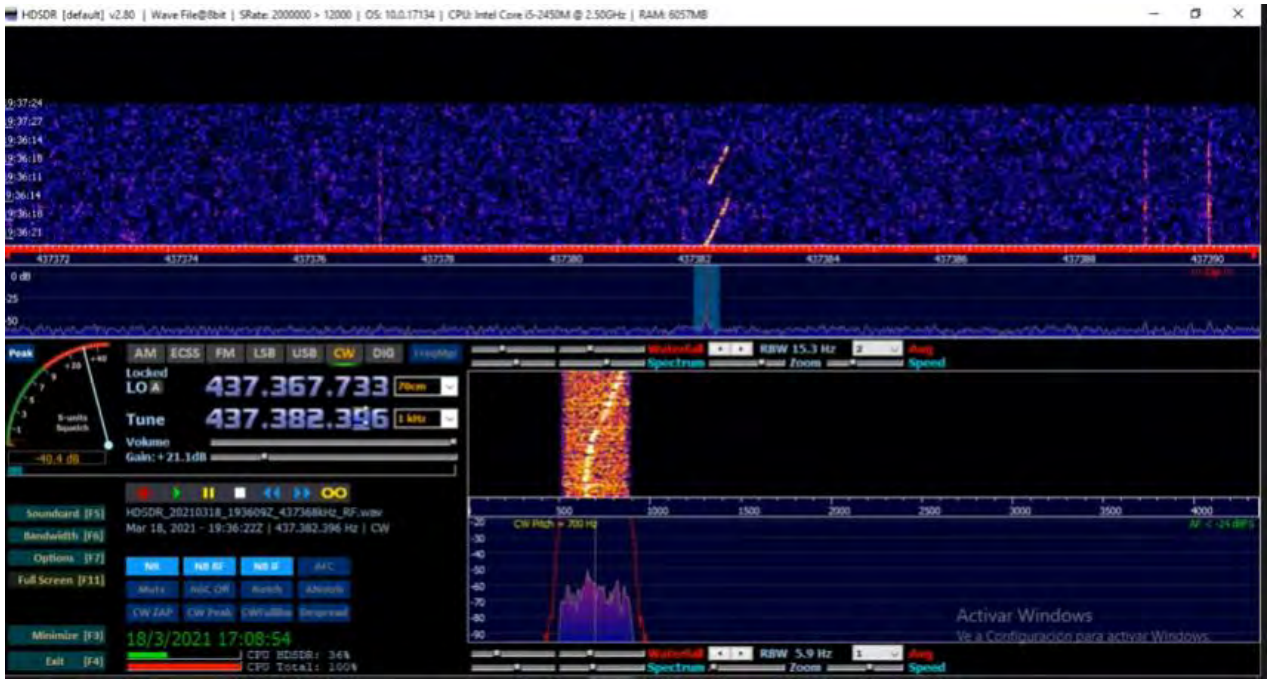
As the ISS orbits the earth, JAXA’s astronaut, Soichi Noguchi, takes a photograph of Asunción, the capital of a new country with a satellite above us. Remind us of the “Little pale blue dot” of Carl Sagan, and And it encourages us to continue working together for the inhabitants of this small piece of land that we call home and mean so much to us.

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

Title: Institution’s Authorities on the deployment day

Contributors: AEP, Miranda et al

After deployment Caburei4S team member Luis Miranda was able to contact GuaranioSat-1



END OF REPORT FROM PARAGUAY

CONSULTATIVE MEETINGS BETWEEN *MINISTRY OF SCIENCE, TECHNOLOGY AND INNOVATION* AND KEY NATIONAL STAKEHOLDERS IN UGANDA

by Omara Bonny (BIRDS-5, Uganda)

starts on the next page

CONSULTATIVE MEETINGS BETWEEN MINISTRY OF SCIENCE, TECHNOLOGY AND INNOVATION AND KEY NATIONAL STAKEHOLDERS IN UGANDA

OMARA Bonny

March 12, 2021

Ministry of Science, Technology and Innovation (MoSTI) provides overall policy guidance and coordination on matters of scientific research, technology development and the entire the National Space Science and Technology (SST) in Uganda.

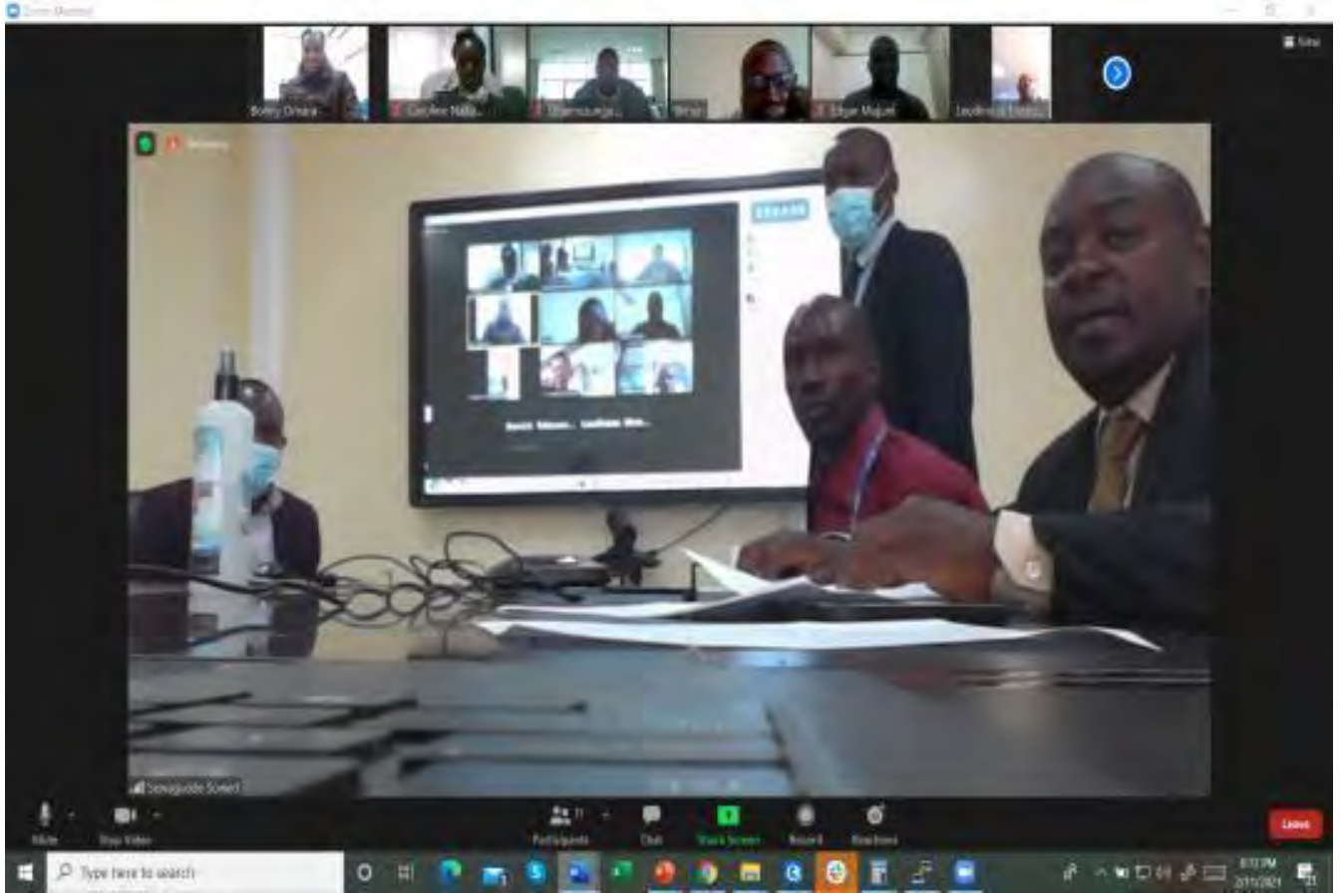
MoSTI launched countywide consultative and awareness meetings with key stakeholders amongst others included; Ministry of Defence and Veteran Affairs, Agriculture, Water and Environment, Lands etc.

The objectives were:

- To sensitize the country on the key issues pertaining to the development of the Uganda National Space Program.
- To gather opportunities and challenges within the country
- To identify possible areas of collaboration.

NARO staff and MoSTI staff at Namulonge

NFA staff and MoSTI Staff at Bugolobi



Most of these meetings were on ZOOM and three Ugandan Engineers building Uganda's first satellite at Kyutech, Japan, were in attendance to provide responses.

Uganda Telecom Ltd Staff and MoSTI Staff at Telephone House.

The tower at the background was built in July of 1980 by Nippon Electric Co. (NEC) Ltd

Costa Rica to create Space Agency; bill passed by Congress

FULL STORY HERE: https://ticotimes.net/2021/02/19/costa-rica-to-create-space-agency-bill-passed-by-congress

ABOVE: Costa Rican astronaut Franklin Chang-Diaz. (Photo via NASA.)

Subject: News from Costa Rica! The Space Agency will be a reality
Date: 2021/03/01

Dear Dr Maeda and Prof Cho,

It is with great happiness that I announce that the legislators of Costa Rica have approved the creation of the Costa Rica Space Agency (AEC). Our SETEC Lab was leading the technical efforts to write the law, and now it is only pending the signature of the president, that announced will sign the law soon, after aspects related to finances are clear.

Please know that it is clear that the success of Project Irazú is part of the justifications to do this step forward, and that the continuous cooperation with Kyutech is for us of outmost importance.

Because of how much Kyutech was important on this, I want to say thank you. I still remember Prof Cho talking about the importance of establishing permanent institutions in our countries related to space. Please be clear that the dreams and goals of Prof Cho and the group are becoming reality also here. Thank you for everything.

Best regards,
Dr. Adolfo Chaves-Jiménez
Lecturer/Researcher
Coordinator, Space Systems Engineering Laboratory (SETEC Lab)
School of Electronics; Costa Rica Institute of Technology

24. Samara Summer Space School

XVI Summer Space School

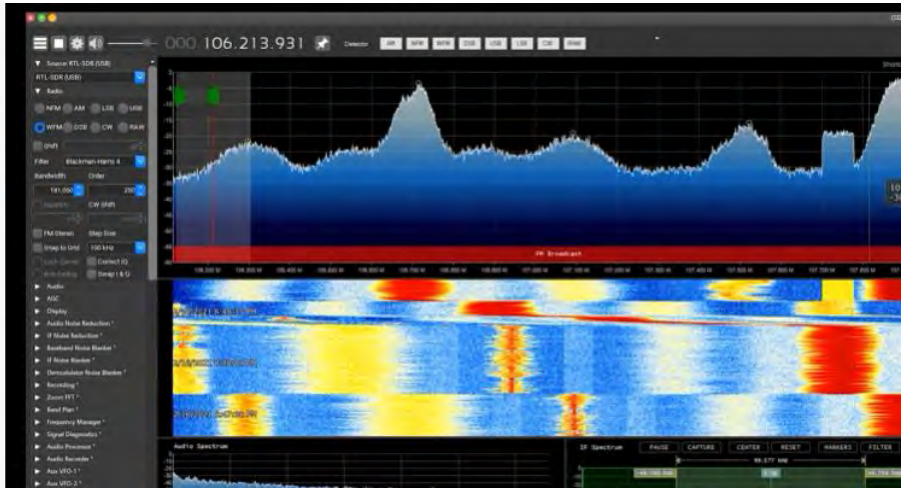
The School is dedicated to the 60-th anniversary of Yu.A. Gagarin into space

August, 30 - September, 10 2021, SAMARA

Registration dead line is 26 March 2021, but it is expected to be extended – check the website.

ALL DETAILS ARE HERE: http://volgaspace.ru/school_cms/index.php

25. The amazing SDR that you can get for under $40



The radio that allows you to listen to almost anything being transmitted through the air: **This SDR Dongle.**
You can buy from Amazon for under 40 USD.
Check out this fascinating video on **YouTube**: https://www.youtube.com/watch?v=h4x7cGALaC8

26. Highlighting Japan: Smart Mobility

PUBLIC RELATIONS OFFICE
GOVERNMENT OF JAPAN

Home > Highlighting JAPAN > Highlighting JAPAN March 2021

HIGHLIGHTING Japan

Monthly magazine from the Government of Japan

March 2021

SMART MOBILITY

INDEX

– THEME FOR March

SMART MOBILITY

Government, industry and academia in Japan are working to promote "smart mobility" services that contribute to solving public transport challenges associated with a declining birthrate and aging population. It is expected that these services, which utilize a range of IoT, AI and automated driving technologies, will also help to revitalize regional economies.

PDF(478KB) ← **Download this pdf with the link below**

Go here to download the March issue: https://www.gov-online.go.jp/eng/publicity/book/hlj/20210301.html

27. Cambodia pushes forward with first satellite

DCLab
Dynamics and Control Laboratory

Home About us Projects Publications Facilities Courses Services Contact us Events Membership Sign in

About UT-ITC Cube

UT-ITC Cube is an international collaboration project to create a CubeSat which will be launched into space. The satellite project is making history as this would be Cambodia's first CubeSat, and in fact, first satellite.

The project is led by Institute of Technology of Cambodia (ITC) with support by University Tokyo (UT) and involves students from Cambodia, UK, Japan, and Colombia. During the project, students from the ITC and UT will work together as one team to produce a detailed CubeSat design, to submit to the KiboCube launch opportunity. The satellite will consider current socio-economic needs in Cambodia. Beyond providing a platform for developing new skills and experiences, the project will create opportunities for new friendships and intercultural understanding.

READ ALL ABOUT IT HERE: http://dclab.itc.edu.kh/ut-itc-cube-satellite-project

28. Space tour by ANA

宇宙旅行の今がわかる！～専門家が紹介する「夢の宇宙飛行機 開発現場」と「ANAの宇宙開発」～

価格	記念品付き：2,980円（税込） 一般視聴：1,980円（税込）
開催日時	3月28日（日） 12:00～13:00
申込期限	3月26日（金） 23:30 ← DEADLINE
定員	記念品付き：100名 一般視聴：300名

おすすめポイント

- こんな方におススメ：宇宙や飛行機の話を聞くのが好き、夢やロマンという響きが好きという方
- 宇宙旅行を可能にする！？夢の「宇宙飛行機」を開発するPDエアロスペース社に潜入！
- 宇宙飛行機って何？を専門家がわかりやすく紹介、質問もできる参加型！
- 実は空だけじゃない、ANAが取り組む宇宙開発も特別に紹介！
- 記念品としてオリジナル搭乗券とPDエアロスペース社のオリジナルコースターをお届け＊

GO HERE:

https://www.ana.co.jp/ja/jp/travel/onlinetour/?cid=EMM200927atm

29. BIRDS-3 approach to project management

1. Introduction

Joint Global Multi-Nation BIRDS Satellite Project (BIRDS) of Kyushu Institute of Technology (Kyutech) targets non space fairing nations to build, test, launch and operate their first satellites in under two years. BIRDS-1 had first satellites for Bangladesh, Ghana and Mongolia while BIRDS-2 had for Bhutan. BIRDS-3 mission statement was to successfully build and launch Nepal and Sri Lanka's first satellites. In April 17, 2019, BIRDS-3's constellation of three CubeSats were part of the payload bound for the International Space Station (ISS). On June 17, 2019, the satellites were deployed in orbit and have since been operational. All major missions have been completed. Fig. 1 shows project timeline.

Project Research II:
BIRDS-3 Satellite Project's Approach to Project Management

8-page report

Abhas Maskey (Student ID: 17595903)
Laboratory of Spacecraft Environment Interaction Engineering
Kyushu Institute of Technology

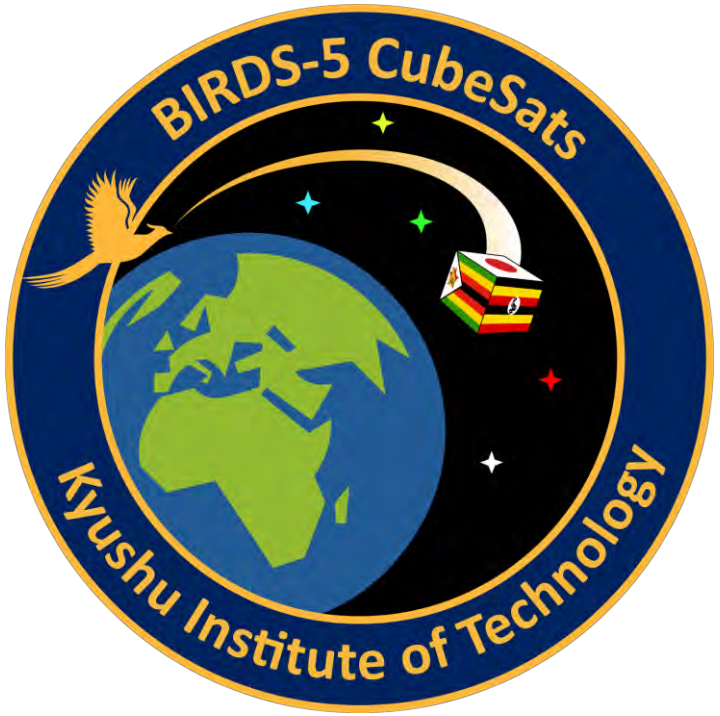
FIRST GO HERE: https://birds3.birds-project.com/outreach/birds-3-satellite-projects-approach-to-project-management/

THEN CLICK ON THIS LINK

BIRDS-3 Satellite Project's Approach to Project Management

March 14, 2021

Abhas Maskey, Project Manager of BIRDS-3 satellite project describes BIRDS-3 team's approach to project management. Please find the full document at this Download Link



The following sections are the BIRDS-5 articles for March 2021 (compiled by Fahd)

In-situ measurements of space plasma particles

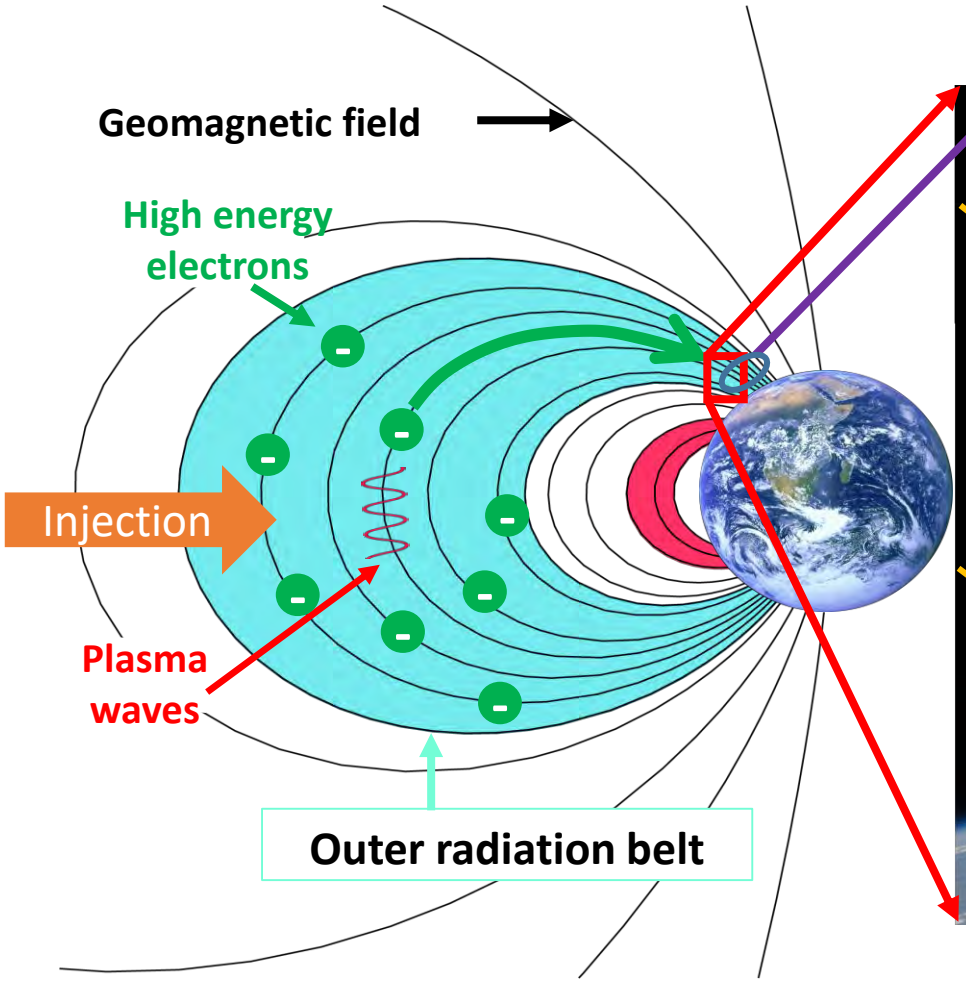
Kazushi Asamura and the PINO team

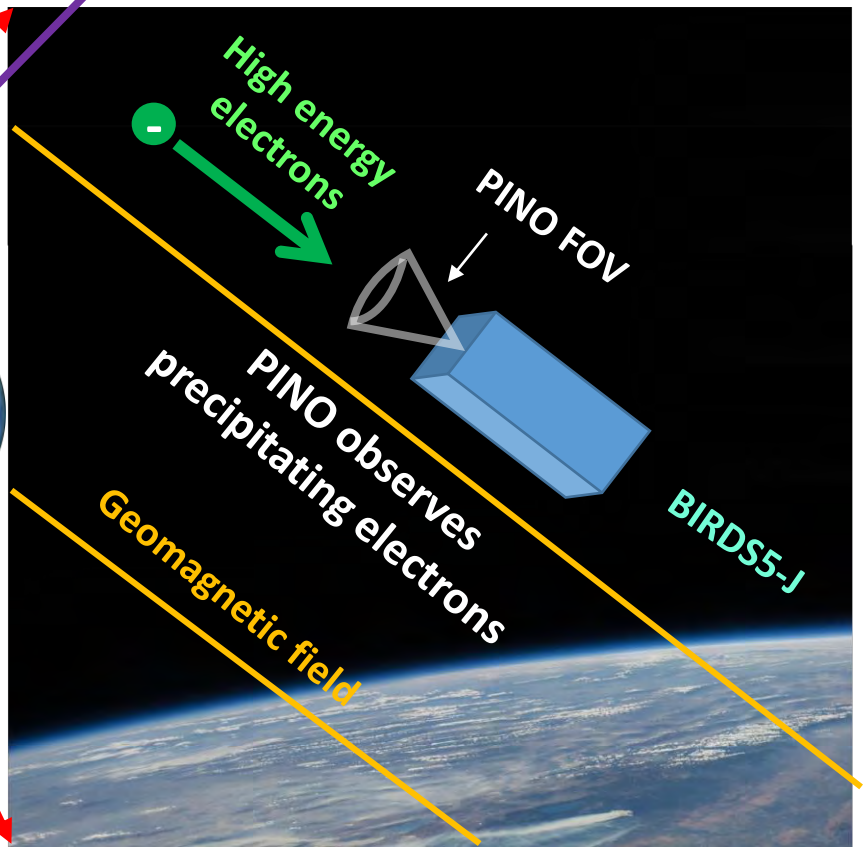
12 March 2021

Precipitating plasma particles lead auroras

PINO observes high-energy (relativistic) electrons precipitating into the atmosphere. Plasma waves play one of the important roles on generation of the precipitation.

The plasma waves can also lead precipitations of lower-energy particles (electrons and ions). These particles energize the dense atmospheric constituents through collisional energy transfer. Then, excited atoms / molecules emit photons at specific wavelengths at the moment of deexcitation…This is the aurora.





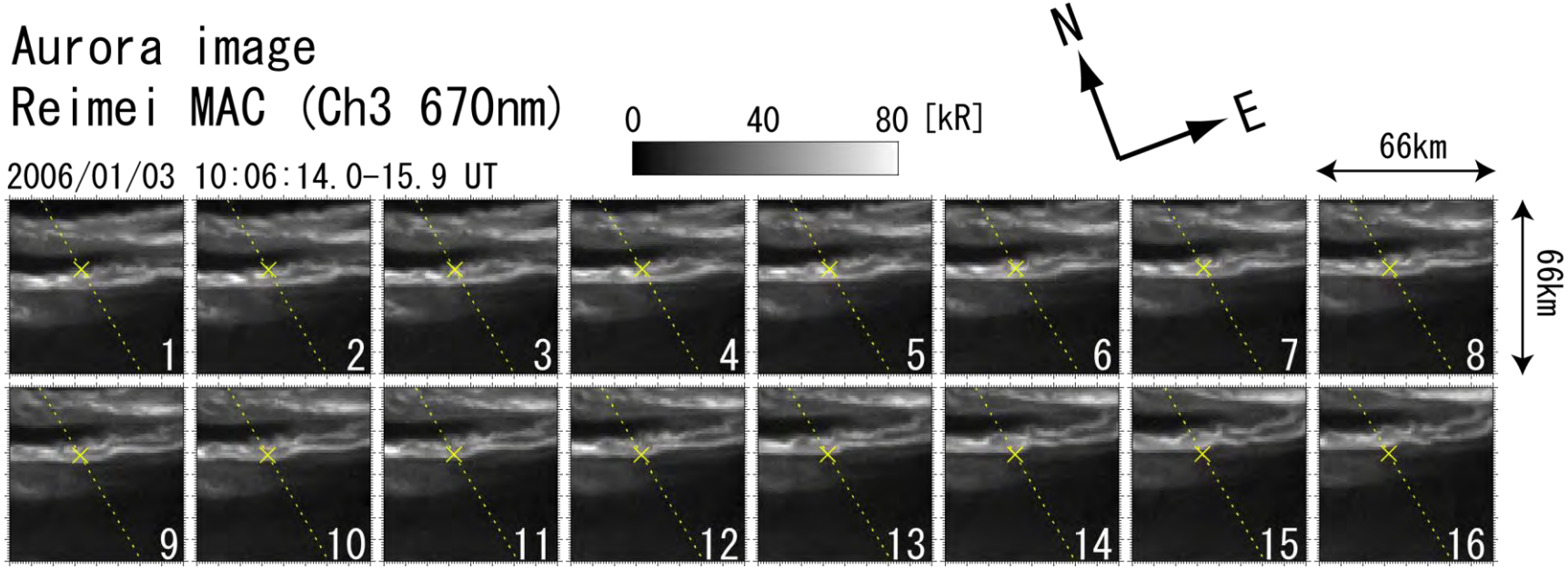
Aurora observed by satellites

Auroras have been investigated by not only ground-based optical observations but also satellites.

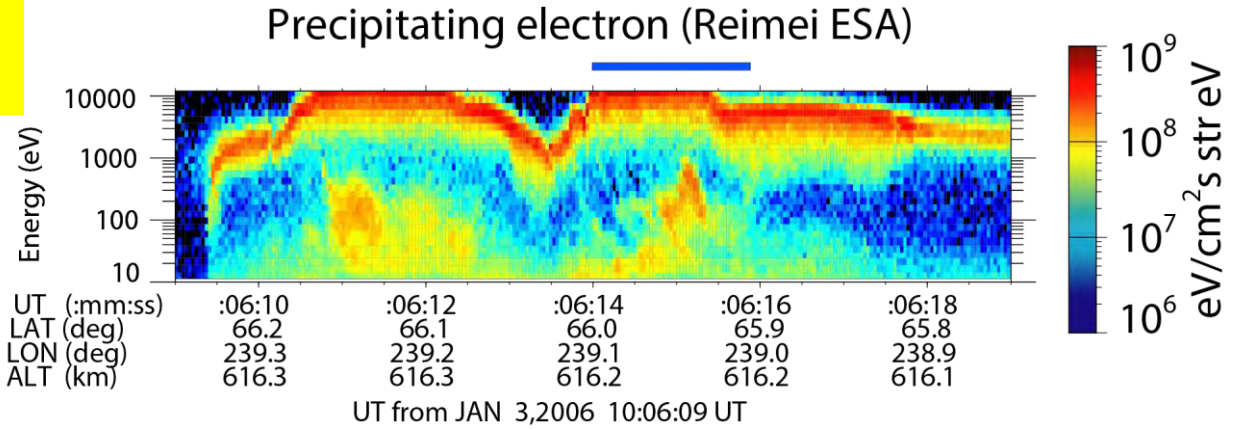
Japanese Reimei satellite found one-to-one correspondence of auroral optical emissions and particle precipitations in fine scale (~1km).

However, there are still a lot of unknowns about how auroral activities are generated: shape, movement, appearance /disappearance, energy source, and then, impact to the atmosphere…

For example, the observed energy distribution of low-energy electrons suggests that electrons are accelerated above the auroras in some ways. How are these electrons accelerated with such fine structures? Still unclear.

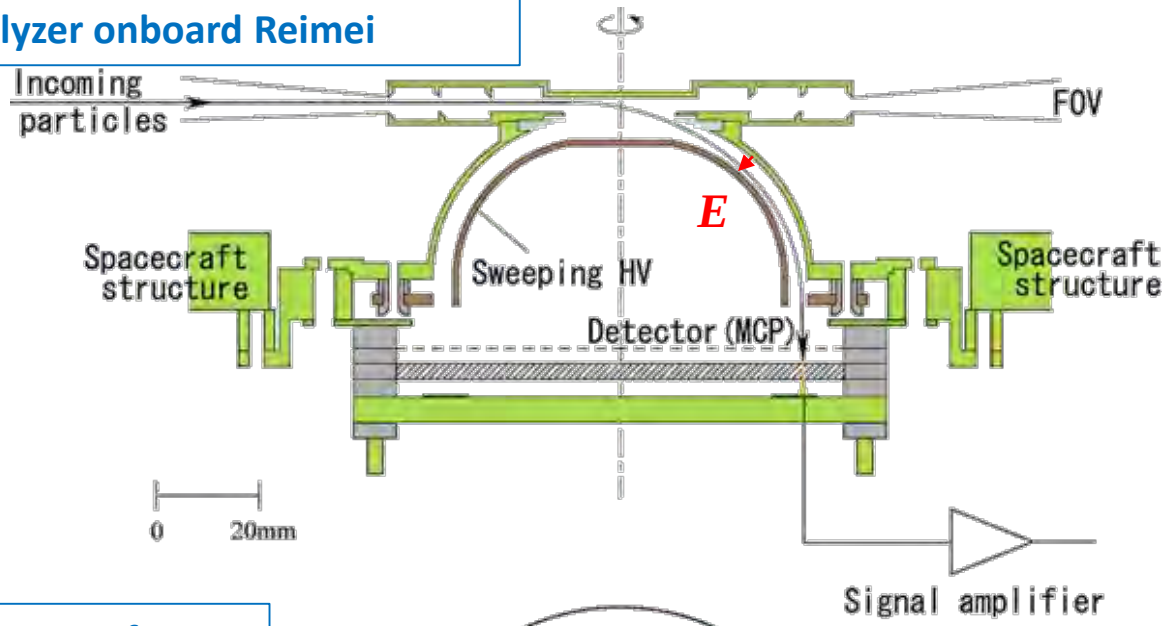


Yellow crosses indicate satellite positions.

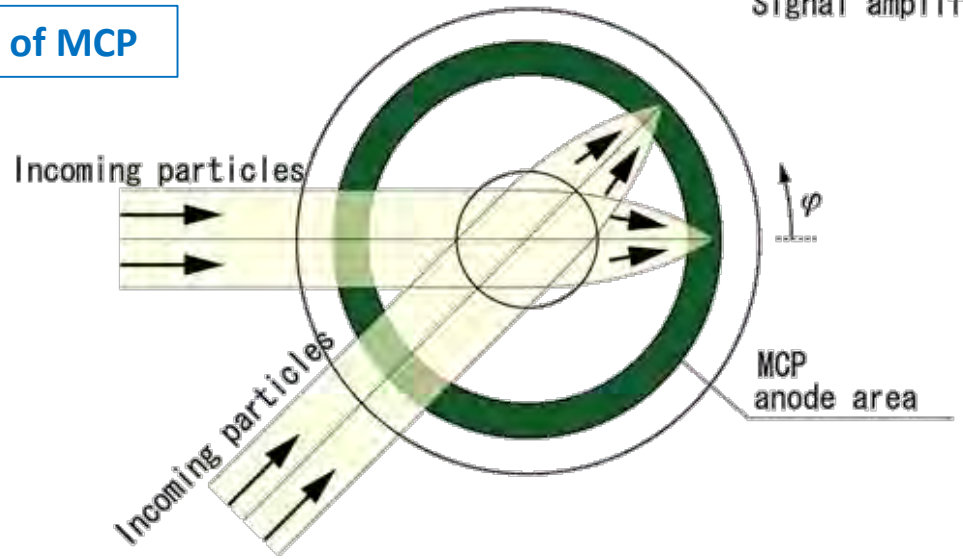


Measurement of low-energy particles

Sectional view of the electron analyzer onboard Reimei



Top view of MCP



PINO observes electrons with energy discrimination by measuring the amount of charge (or electron-hole pair) generated by particles injected into the detector.

However, lower-energy particles (< ~10keV for electrons, < a few tens of keV for protons), which are significant contributors for auroral optical emissions, cannot generate charges detectable enough, nor even inject into the detector.

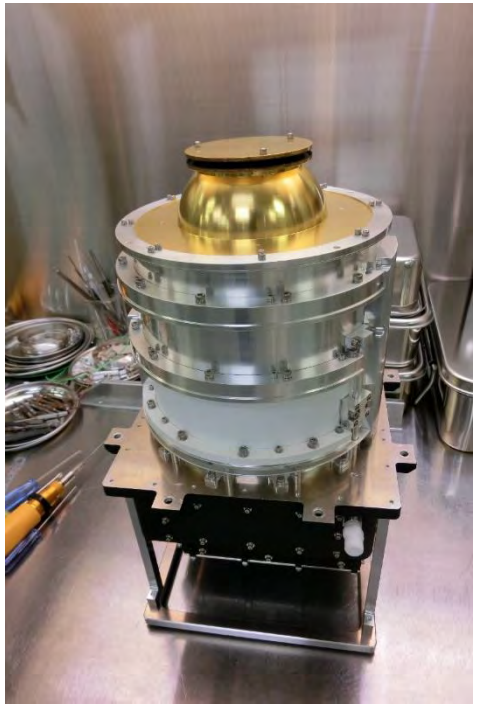
MCP (MicroChannel Plate) is commonly used for particle detection in this energy range. MCP is just an electron multiplier, so we need energy analysis in a different way from PINO.

Electrostatic deflection for particle trajectories inside the sensor is one of the methods for energy analysis. Energy of particles which can reach the MCP detector is changed when we change the applied voltages on the sensor electrodes…Sweeping the applied voltage as a function of time provides the energy analysis.

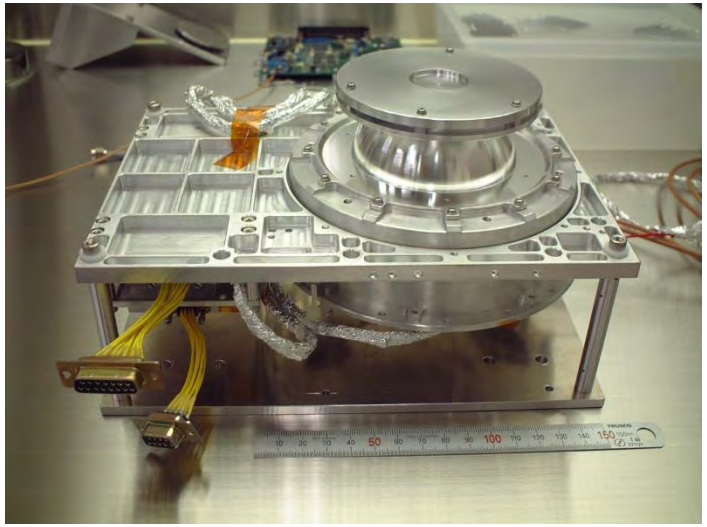
Platform

Size of particle instruments utilizing the MCP is not so small normally, say, an order of 10cm at least. It is not easy to fit the available volume on a cube-sat, if this size is unchanged.

However, simultaneous observations of plasmas at separated (but neighboring) locations are crucial to reveal auroral physics in future. Cube-sat is one of the realistic ways to get an opportunity of such a multi-satellite mission. Development of miniaturized particle analyzers which can fit the size of cube-sat is included in our business.



Ion analyzer (LEPi) onboard Arase satellite



Electron analyzer (ESA) onboard Reimei satellite

New Design of DLP Structure

By : Kohei Kamitani
2021/3/9

DLP New Design

I have modified the DLP structure as shown in Fig. 1.

The Boom is made of plastic parts and it is fixed to the panel using spring hinges.

After release into space, the fishing wire that holds the Tip in place is burned off with the nichrome wire, and the DLP is deployed by the spring hinge.

I performed some measurements to confirm that this structure meets JAXA's requirements.

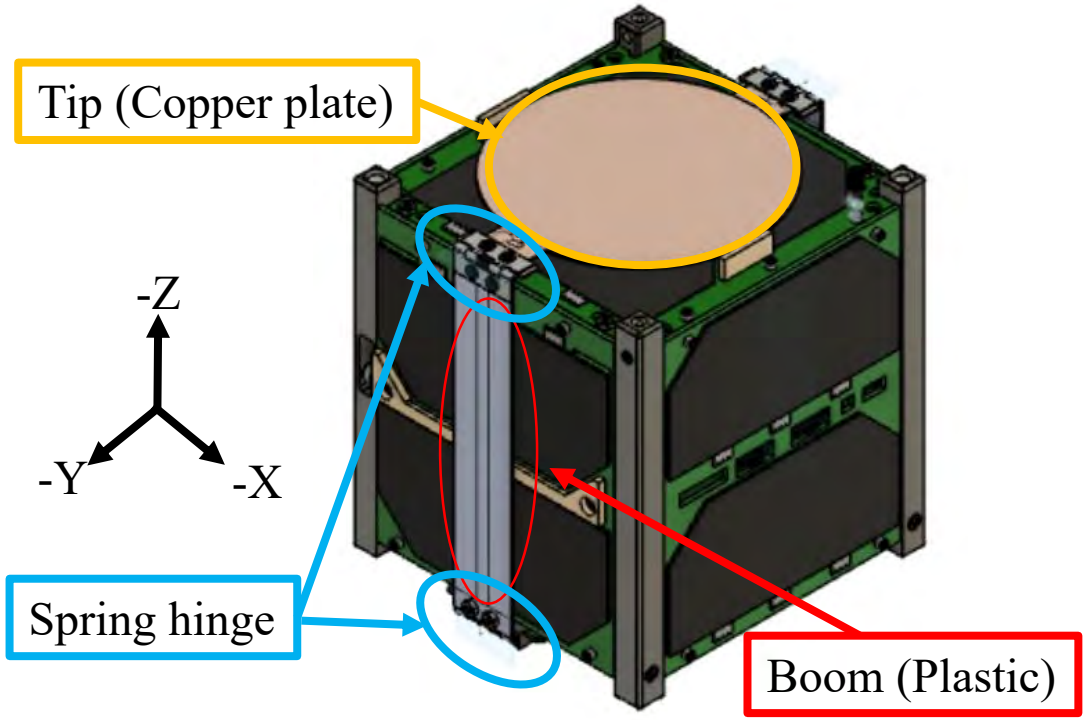


Fig.1 New design of DLP

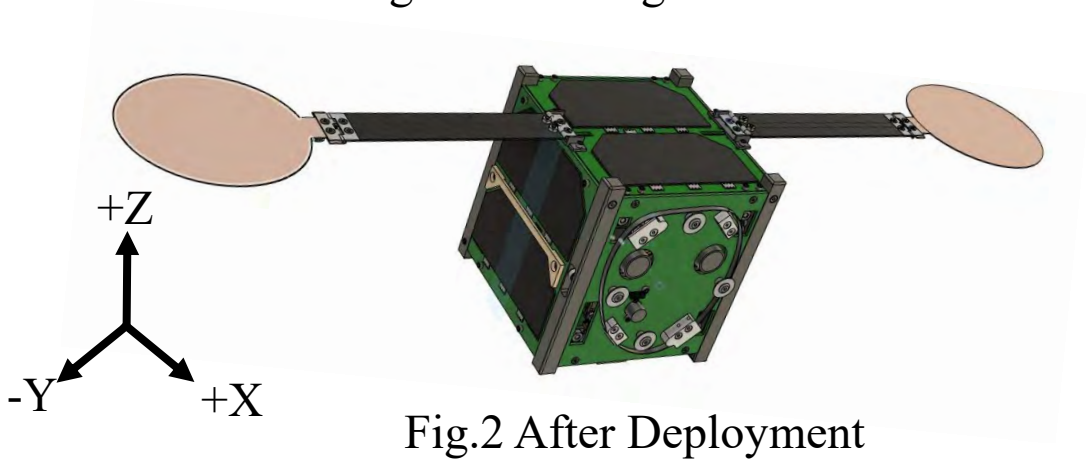


Fig.2 After Deployment

Test of DLP structure

Measurement of the DLP structure size

I investigated whether the structure of DLP fits within the requirements of JAXA.

Measurement point	Result (mm)	Requirements
−Z panel	5.0	≦5.0
±Y panel	6.2	≦6.5

It was within the required range.

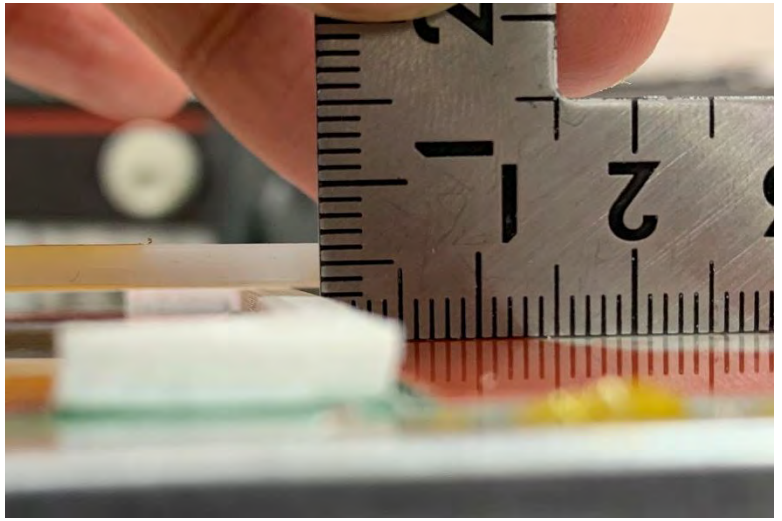


Fig.3 Measurement of size

Vibration test

I tested whether the vibration at launch would break the DLP.

As a result of the vibration test, no damage was found in the DLP, but looseness was found in the screws used for fixing.

Fig.4 Vibration test

Test of DLP structure

Deployment test

I investigated whether DLP succeeded in deploying by passing an electric current through the nichrome wire and burning off the fishing line.

	Voltage(V)	Current(A)	Time(S)	Results
1	2.8	2.67	4.52	success
2	3.1	2.98	3.80	success
3	2.9	2.96	4.56	success

I did the test three times and all succeeded.

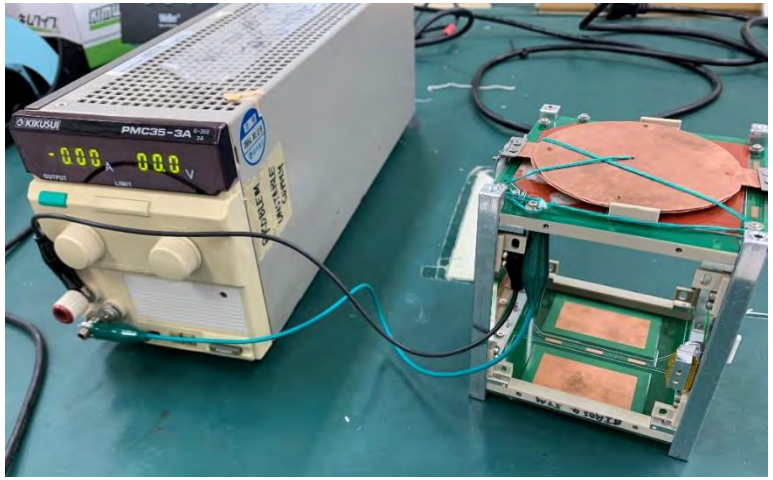


Fig.5 Deployment test

Next Step

I will further improve the DLP structure and conduct plasma measurement tests.

Multispectral Camera Testing

OMARA Bonny

March 11, 2021

Boarding cable car from down to top

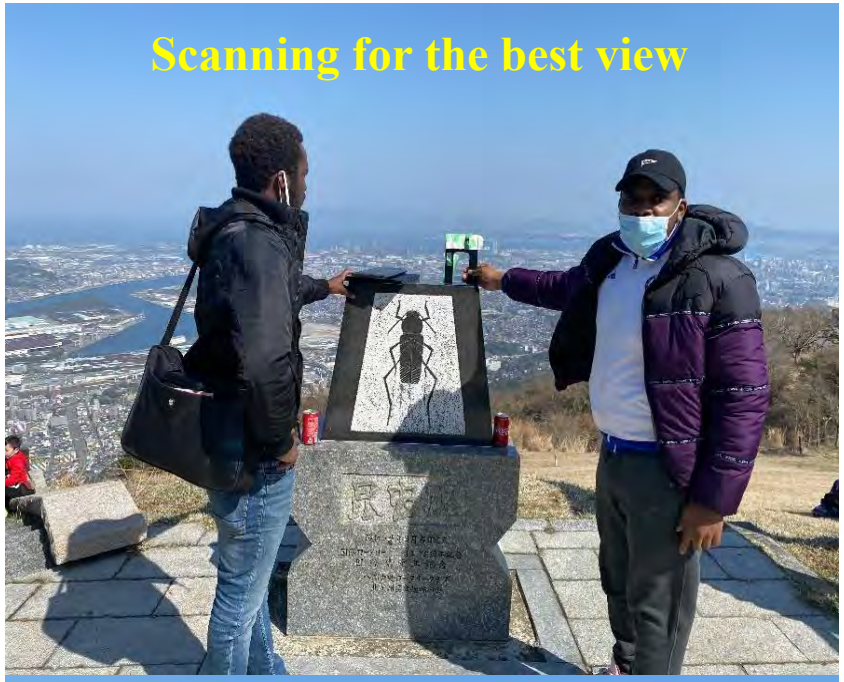
Work without play makes Jack a dull boy

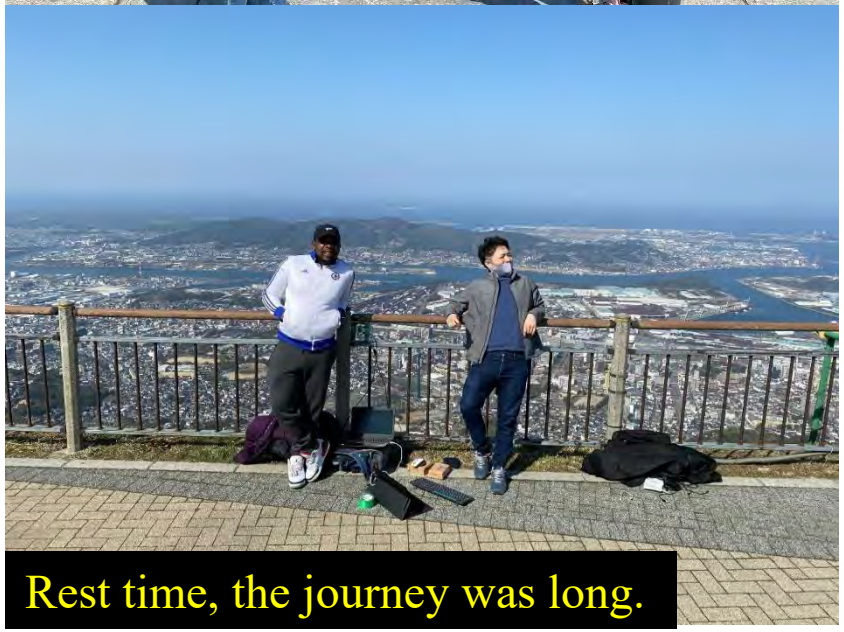
BIRDS-5 is implementing multispectral camera to facilitate analysis of water quality, soil nitrogen, land use and cover.

As development processes are advancing steadily, there is need to assess fundamentals paraments of the camera system before integration with other subsystems.

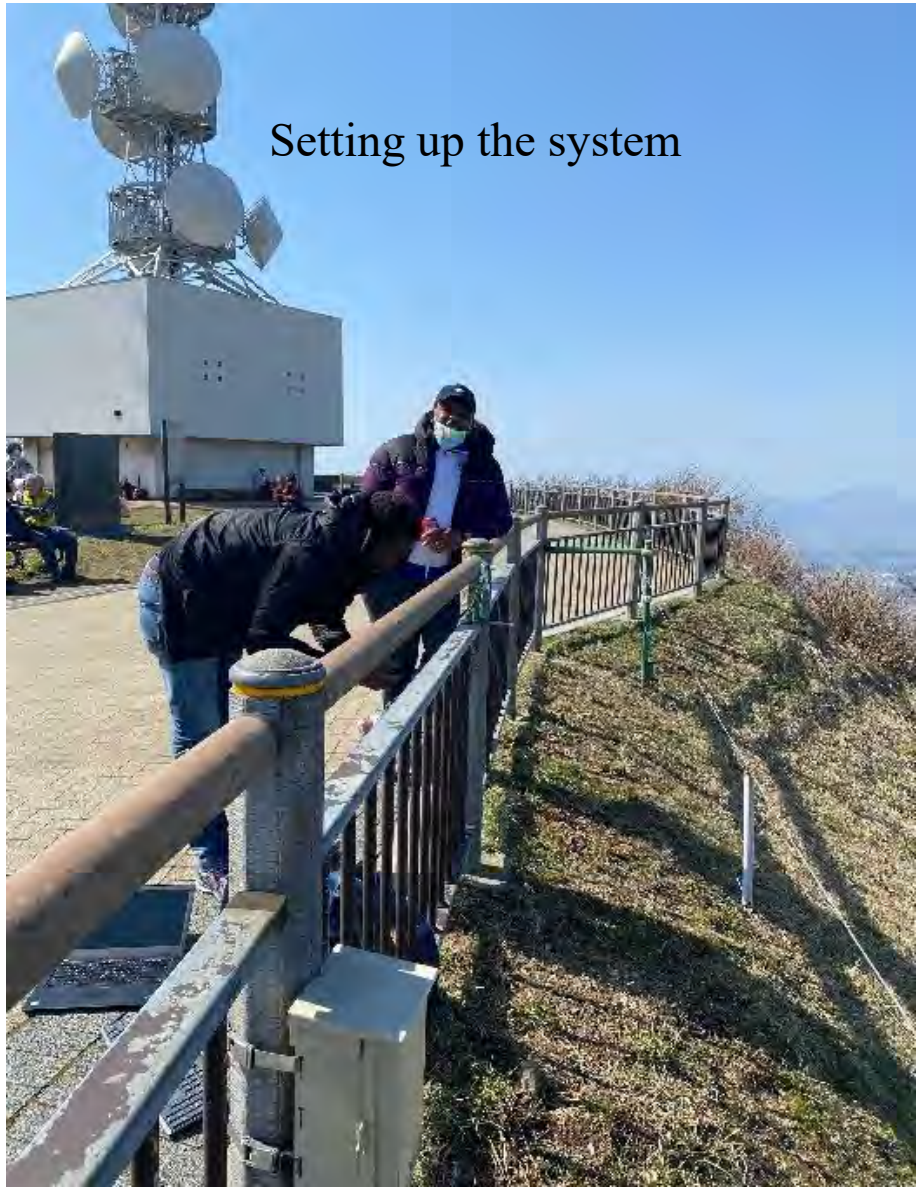
Sarakura Mountain, about 620m high, provides the best view to conduct this test.

Scanning for the best view





Rest time, the journey was long.



Victor from Zimbabwe was setting the focus.

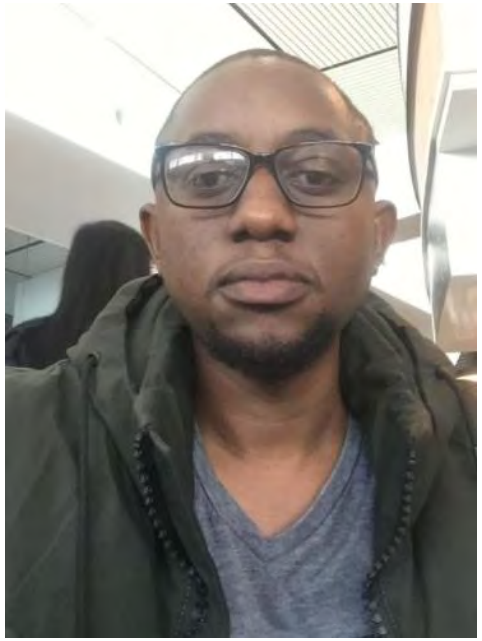

Running the script to capture KYUTECH view

After 4 hours of hard work, the team went for dinner

Boarding cable car from top-down.

Hamburg after a long day.

Hysteresis Dampers

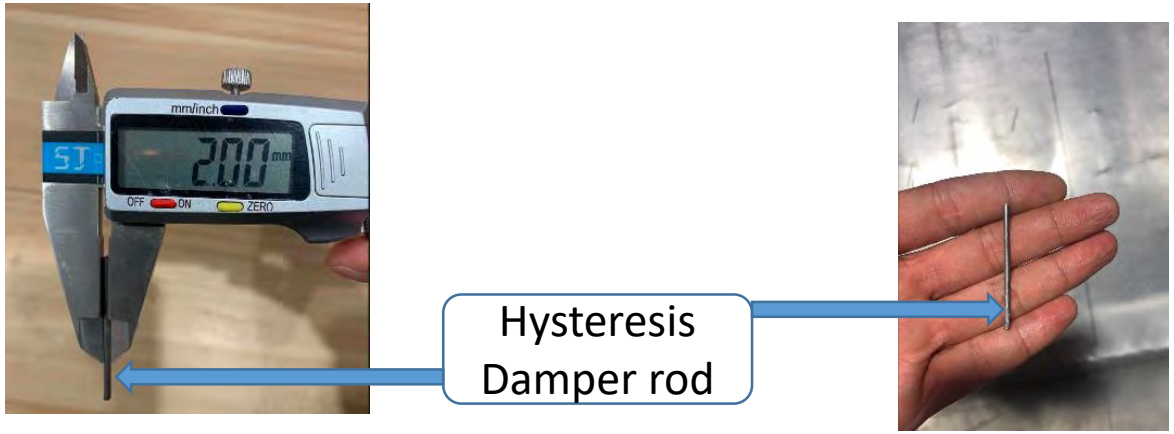


By : Timothy Kudzanayi Kuhamba

Date: 9 March 2021

Hysteresis damper

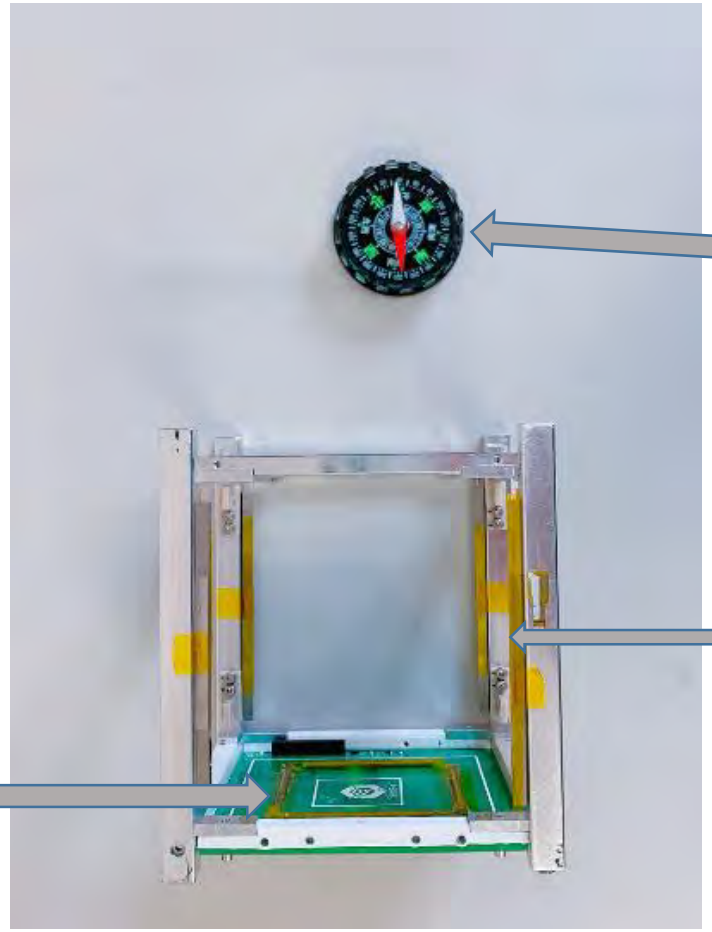
- Used in Passive attitude stabilization to dissipate the energy motions occurring during deployment, or caused by other perturbations.
- The Hysteresis damper (HD) is a favorite among other types of passive dampers due to its properties :
    - Simple design
    - High reliability
    - Good stability of its characteristics in time
    - Easy allocation inside of a satellite structure



Attitude dynamics of a small-sized satellite equipped with hysteresis dampers

Permanent magnets and hysteresis dampers

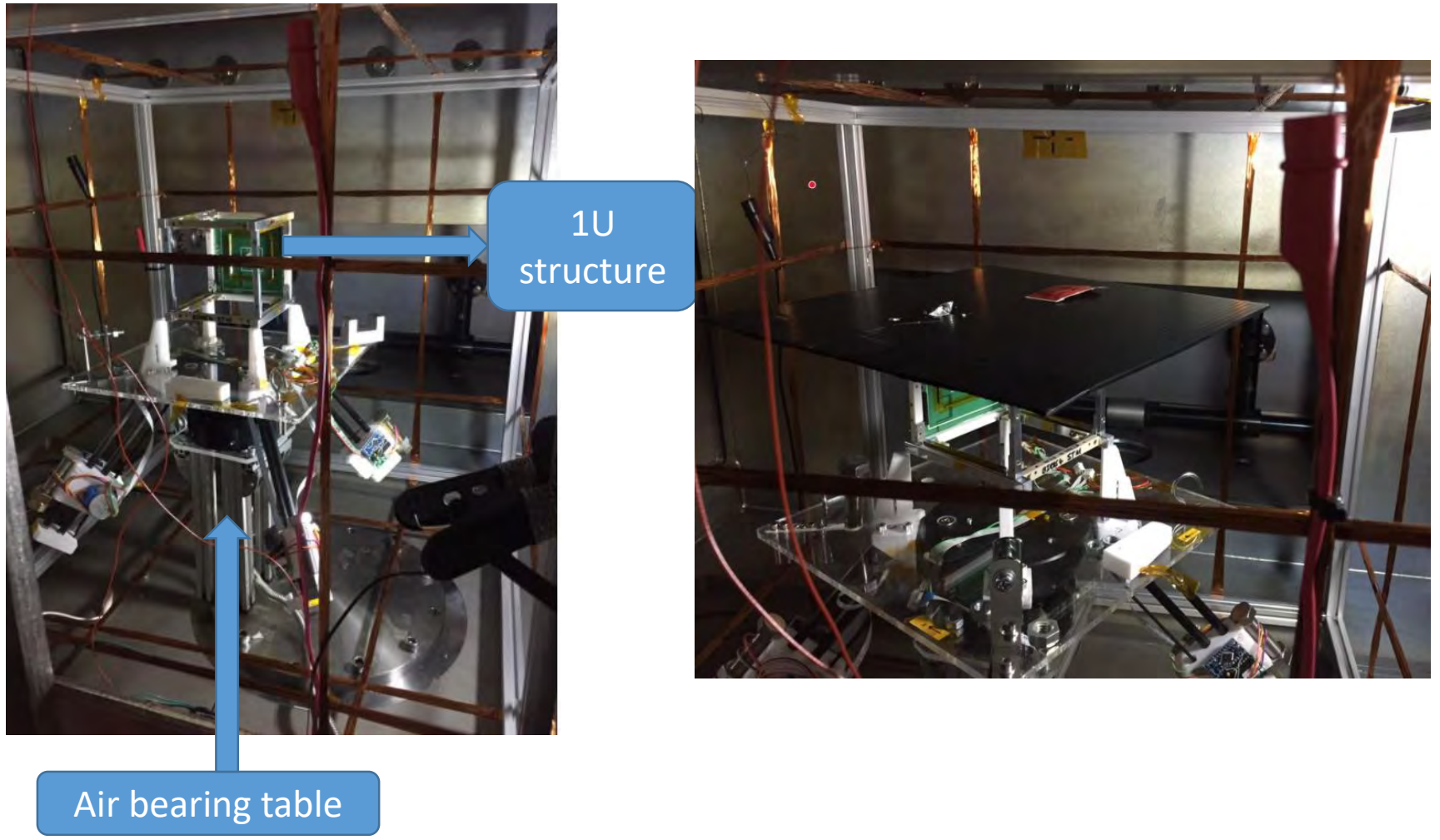
Magnetic hysteresis rods are used to create passive de-tumble torques on the satellite.



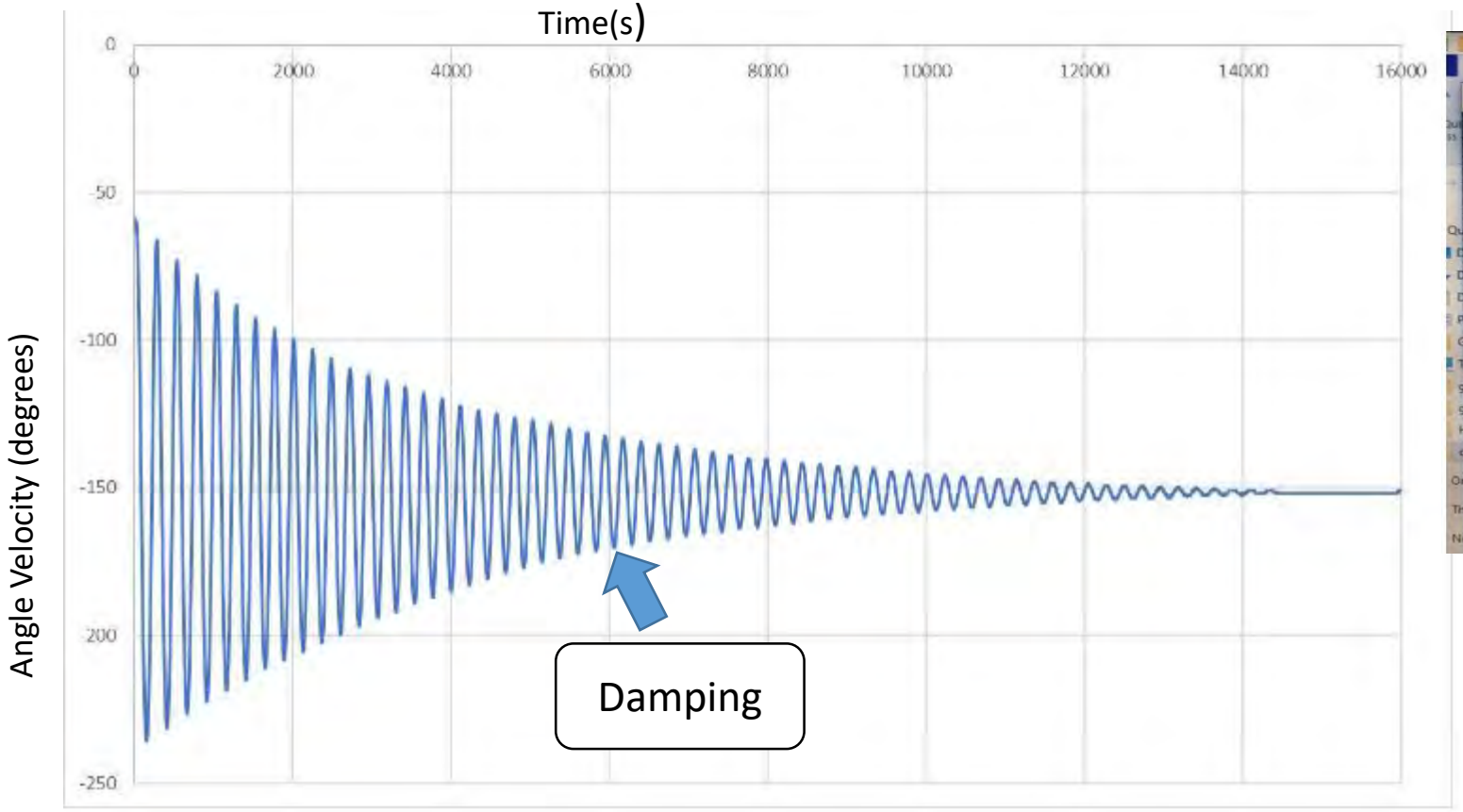
Standard BIRDS-4 1U structure used for testing

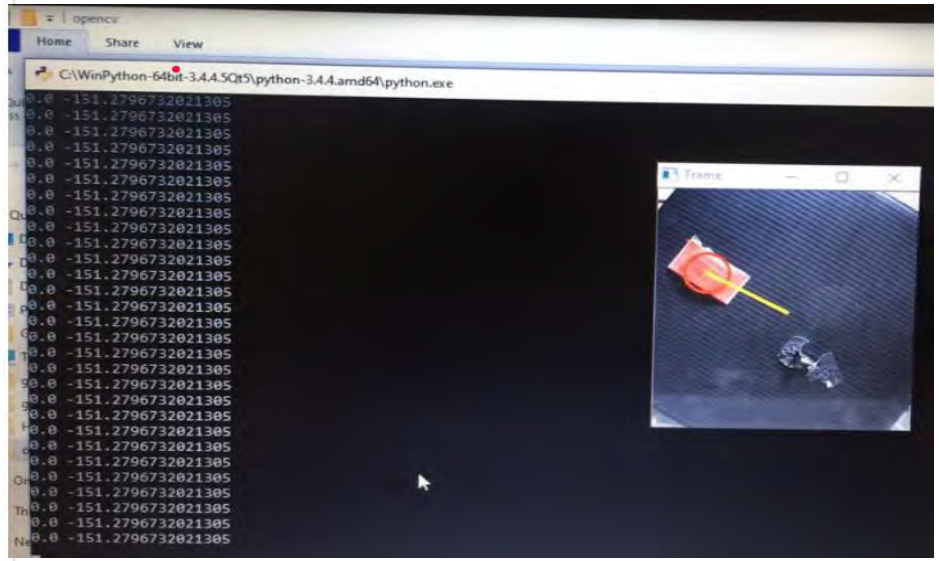
Air bearing table test

In order to test our subsystem, it is necessary to conduct an air bearing table test allowing frictionless rotation in defined degrees of freedom



Angular rotational Damping





When the angular velocity of the CubeSat is less than 0.1 degree per second, then it is considered that the satellite is stabilized.

Factors when selecting hysteresis dampers

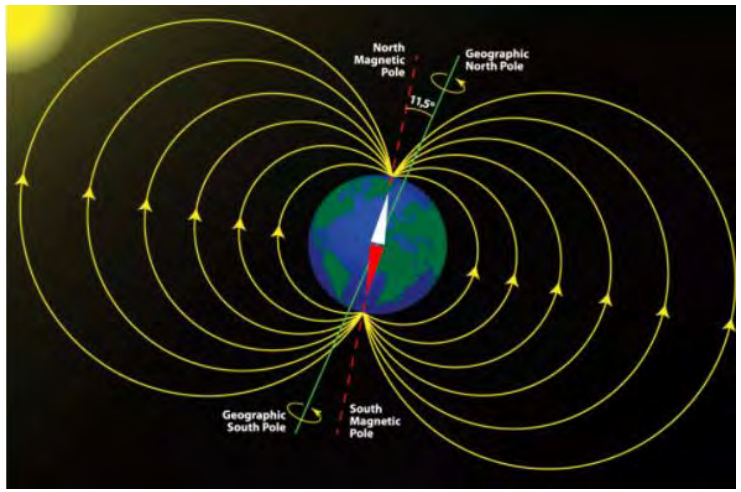
- Configuration of the damper,
  - The Shape
  - The geometric and magnetic parameters
  - The volume of the damper (its allocation should be determined)

- The damping capacity of a hysteresis rod is directly proportional to its volume

Reference : Assal Farrahi and Ángel Sanz-Andrés, 2013, *Efficiency of Hysteresis Rods in Small Spacecraft Attitude Stabilization*

Conversion of Mechanical Energy To Heat Through Magnetic Hysteresis Loss

- While an Earth-orbiting satellite is in its initial rotation mode, the hysteresis rods mounted on it will experience a time varying magnetic field.



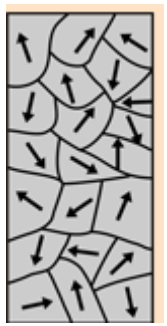
Reference : Robert E. Fischelli ,1961, ***Magnetic Damping of the Angular Motions of Earth Satellites***

The Earth's magnetic field, magnetic poles and geographic poles. http://www.shutterstock.com/gallery-307777p1.html#id=106154861&src=08bd63061cb3d60aa4feaff5cceeae94-2-47

- This causes the flux density in the rod to vary.

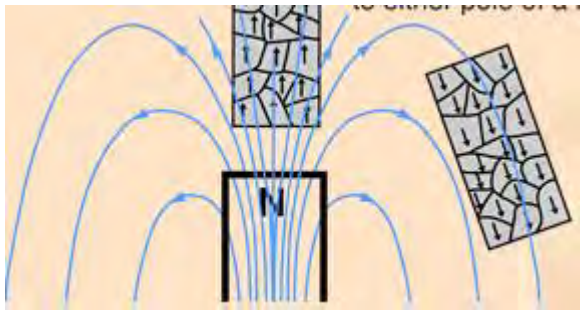
Magnetic domains

- **Magnetic hysteresis** occurs when an external magnetic field is applied to a ferrimagnet such as iron. The atomic dipoles align themselves with the magnetic field
- Alignment



Un-magnetized material

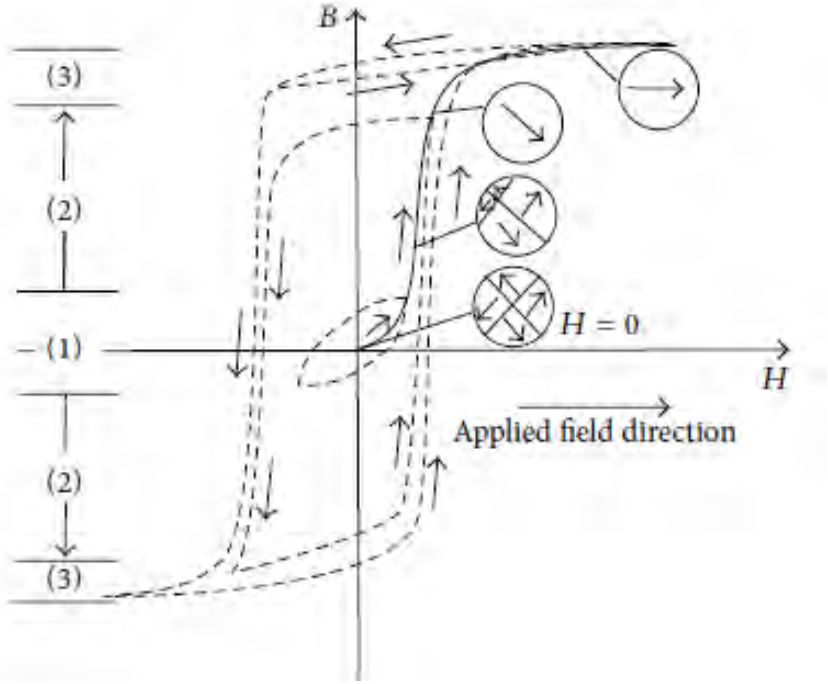
External magnetic field



- Magnetic moment –the property of a magnet that interacts with the applied field to give a mechanical moment

Reference : http://hyperphysics.phy-astr.gsu.edu/hbase/Solids/ferro.html#c3

Hysteresis loop



Heat is generated as a result of internal friction due to the motion of magnetic domains within the permeable rod, a permeable rod spinning in the Earth's magnetic field has :

(1) A reversible domain boundary displacement
(2) An irreversible domain boundary displacement
(3) A rotational motion of the domains.

The amount of hysteresis losses is proportional to the enclosed area within the loop

Reference : Assal Farrahi and Ángel Sanz-Andrés,2013 Efficiency of Hysteresis Rods in Small Spacecraft Attitude Stabilization

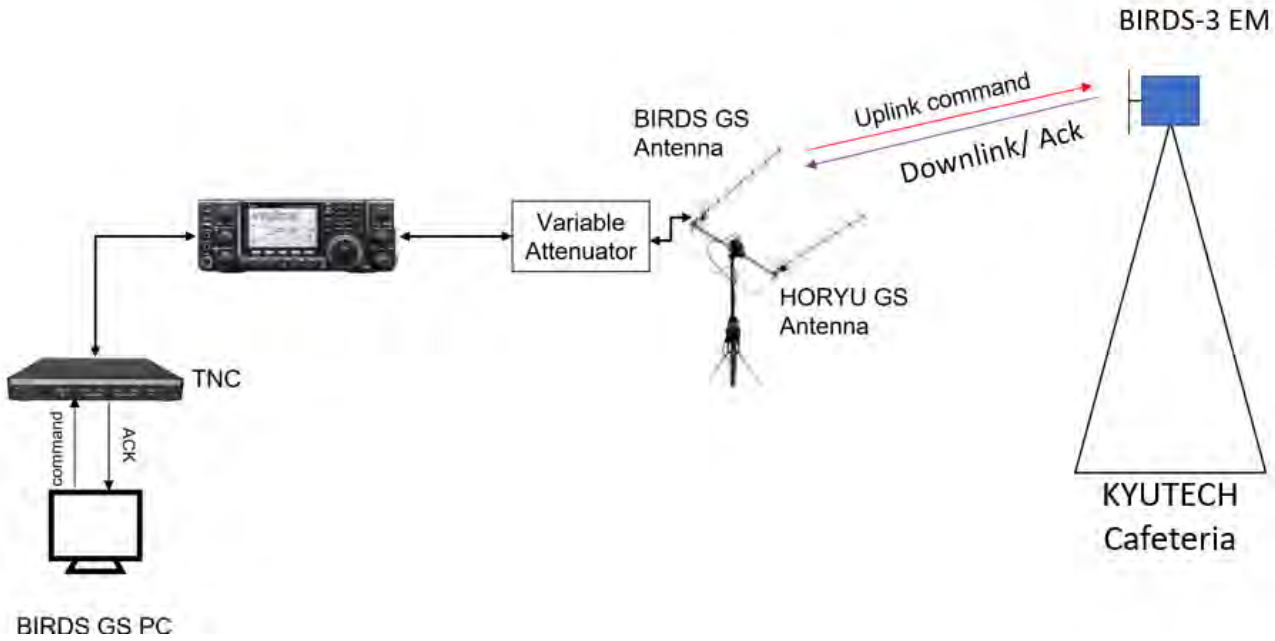
Short Range Communication Tests

By: Edgar Mujuni

8th March 2021

Short Range satellite communication testing

- A satellite communication system is composed of the two segments: the Space segment (Satellite itself) and the Ground segment (Ground station or GS).
- Once deployed into space, effective communication between the satellite and ground station is the most important, otherwise the satellite will be lost, and no single mission can be achieved.

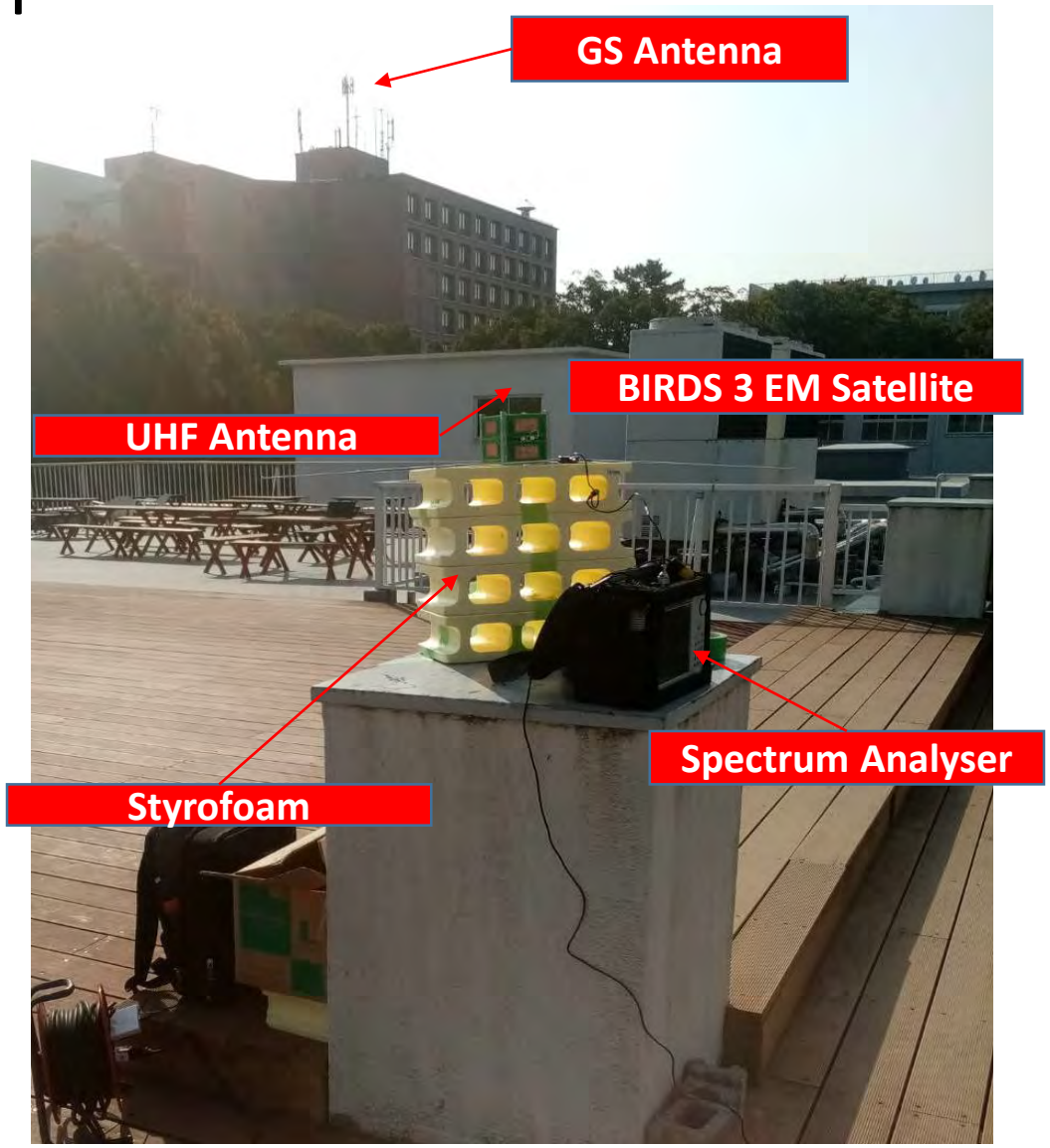


The short-Range tests inside the Campus was done between two points: Kyutech GS and Kyutech Cafeteria (生協), which are about 200m apart.

Test setup on Kyutech Campus

- This communication involves sending uplink commands from the ground station to the satellite.
- The satellite responds to commands with the downlink data to the ground station.
- Before any satellite is sent to space, several tests must be done to ensure effective communication after deployment.

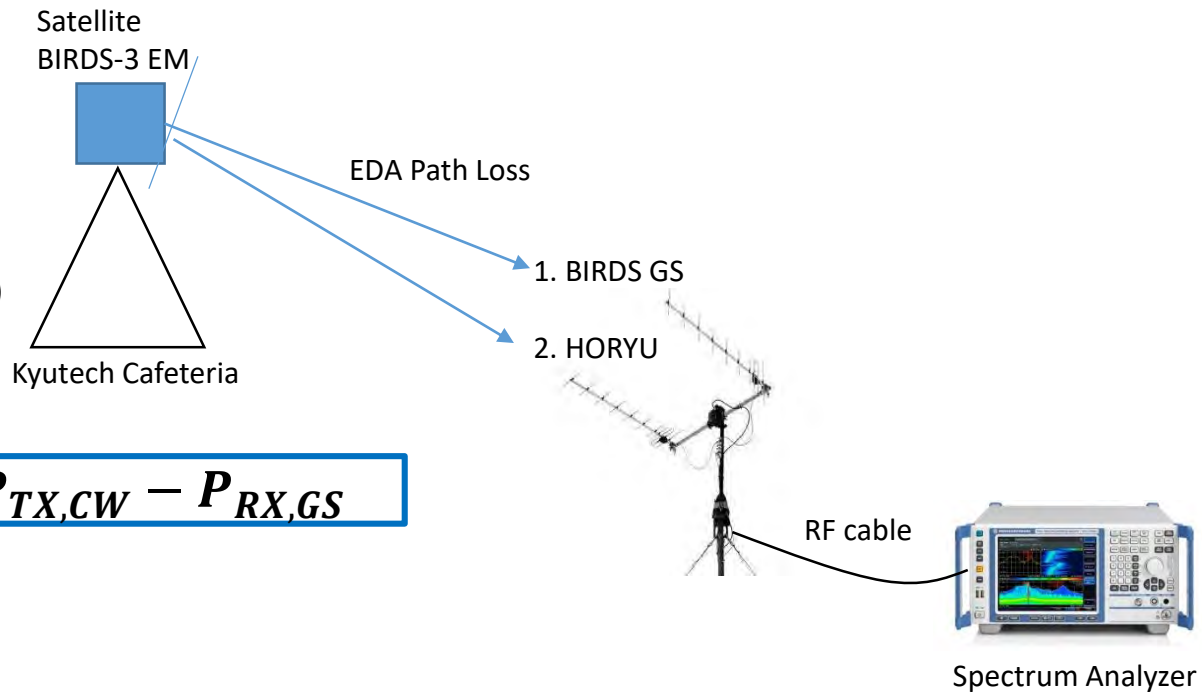
In this article, I talk about the short-range communication test, that is basically to verify command uplink to the satellite, data downlink to the ground station, effective uplink attenuation (EUA) and effective downlink attenuation (EDA).



Effective Downlink Attenuation

In carrying out these tests, the Ground station antenna's Elevation and Azimuth are adjusted towards the satellite to achieve maximum pointing and minimize losses.

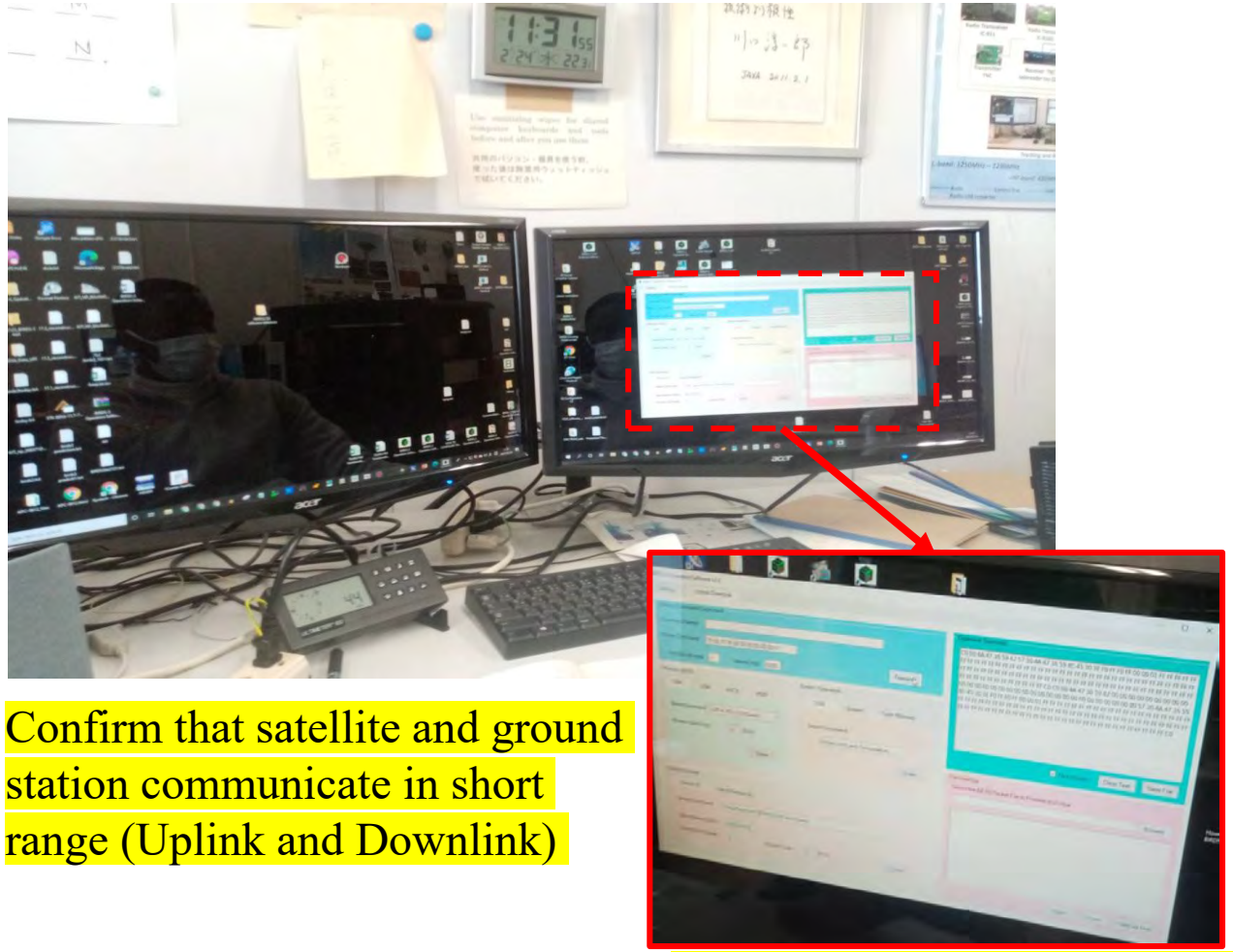
- Under Effective Downlink Attenuation, the satellite is usually transmitting CW at regular intervals.
- This CW is always received with the ground station equipment. In this case, the received power CW power by different antennas (BIRDS & HORYU) in their fixed positions is used to calculate the EDA (see below) for the satellite.



$$\textbf{Effective Downlink Attenuation (EDA)} = P_{TX,CW} - P_{RX,GS}$$

Effective Downlink Attenuation

- For command uplink and data downlink test, we need to confirm that the ground station is able to transmit to a satellite. The satellite is able to respond to the command with packets of data.
- Under Effective Uplink Attenuation, we vary the transmission power from the ground station with signal attenuators. The signal attenuation is increased in steps until the satellite cannot respond to the uplink commands.
- This is used to evaluate the minimum transmission power that a satellite can respond to a command from ground station.



Confirm that satellite and ground station communicate in short range (Uplink and Downlink)

BIRDS-3 Operation Software

Anechoic Chamber Test Training

By : Ramson

Date: 09/03/2021

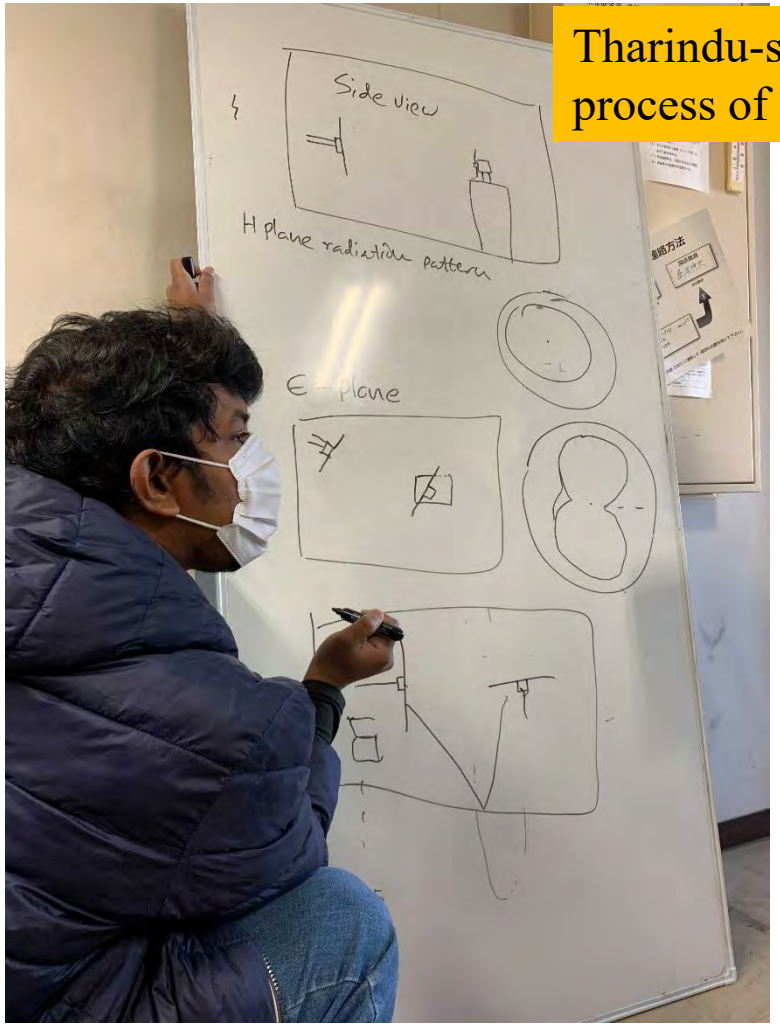
Training in Pictures

Dr. Kim explaining the floor setup and how reflectors are set up

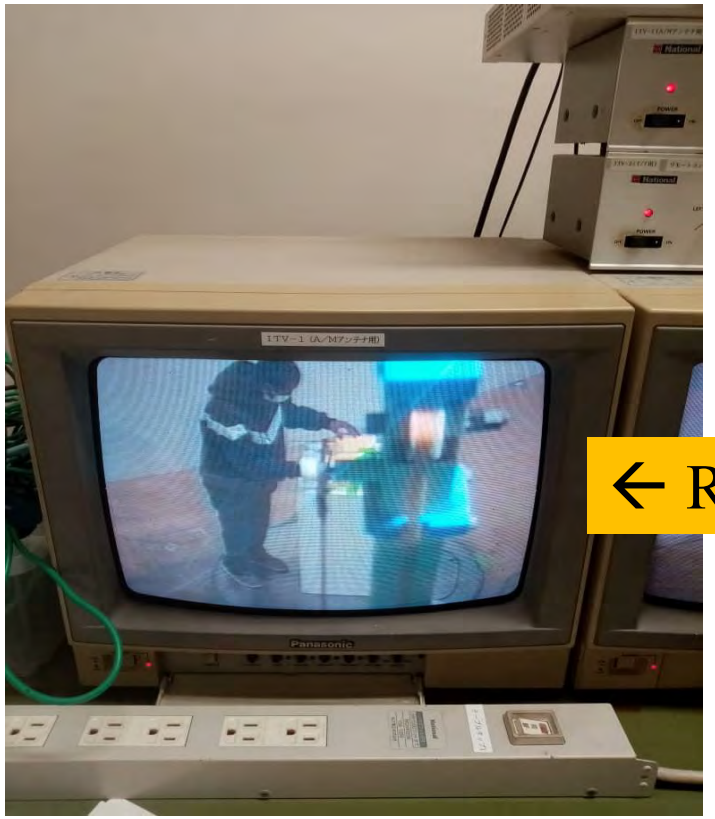
Nakayama-senpai elaborating on how to use the equipment and take measurements

Tharindu-senpai giving an account on how to set up the satellite and antenna axes (E and H planes)

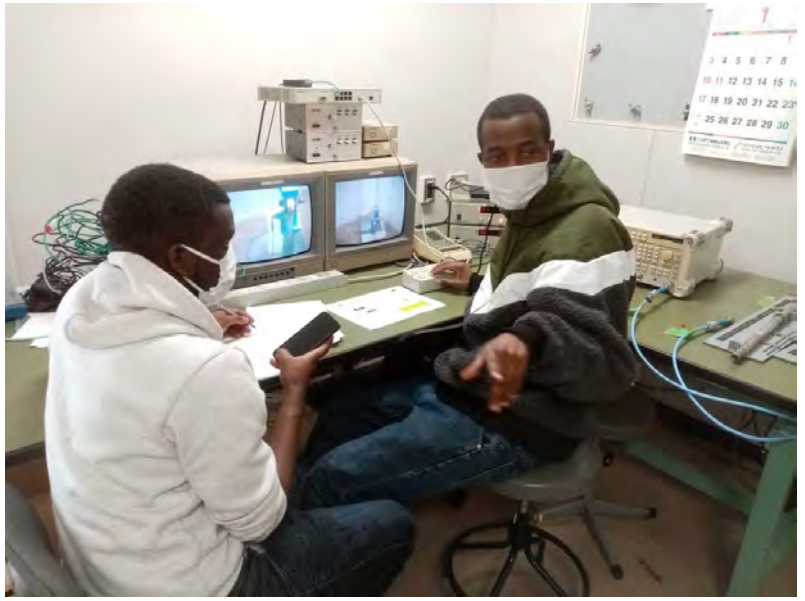
Training in Pictures



Tharindu-senpai demonstrating the whole process of the anechoic chamber tests



← Ramson at work !!!!!!



Communication Team now trained and can operate alone

Test Carried Out in the Anechoic Chamber

Test – 1 : Antenna tuning (Measuring the S11)

Test – 2 : Measuring Dipole Antenna Radiation Pattern

With Radio Setup

Test – 3 : Measuring TRX Sensitivity with Dipole Antenna

With Signal generator Setup

Test – 4 : Measuring TRX Sensitivity with Dipole Antenna

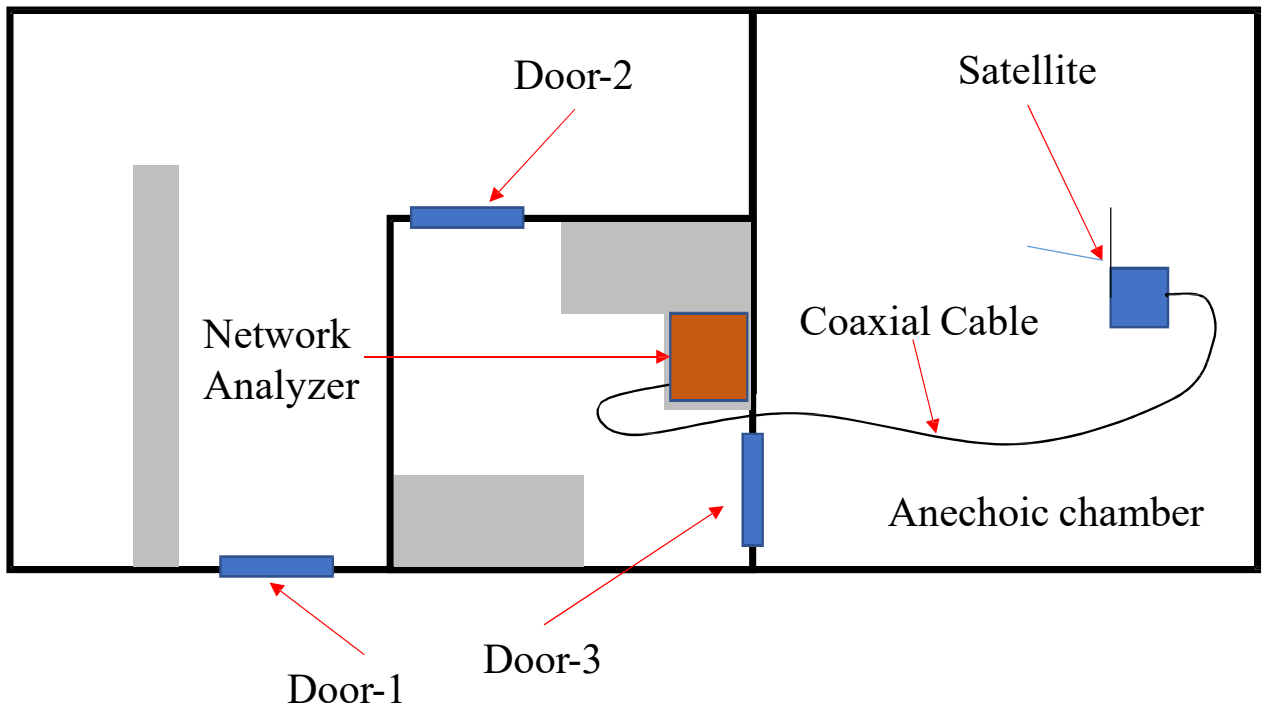
Ref. BIRDS-3

TRX = Transceiver

Test-1: Antenna tuning (Measuring the S11)

- To measure S11 value network analyzer is used (calibrated)

Test setup

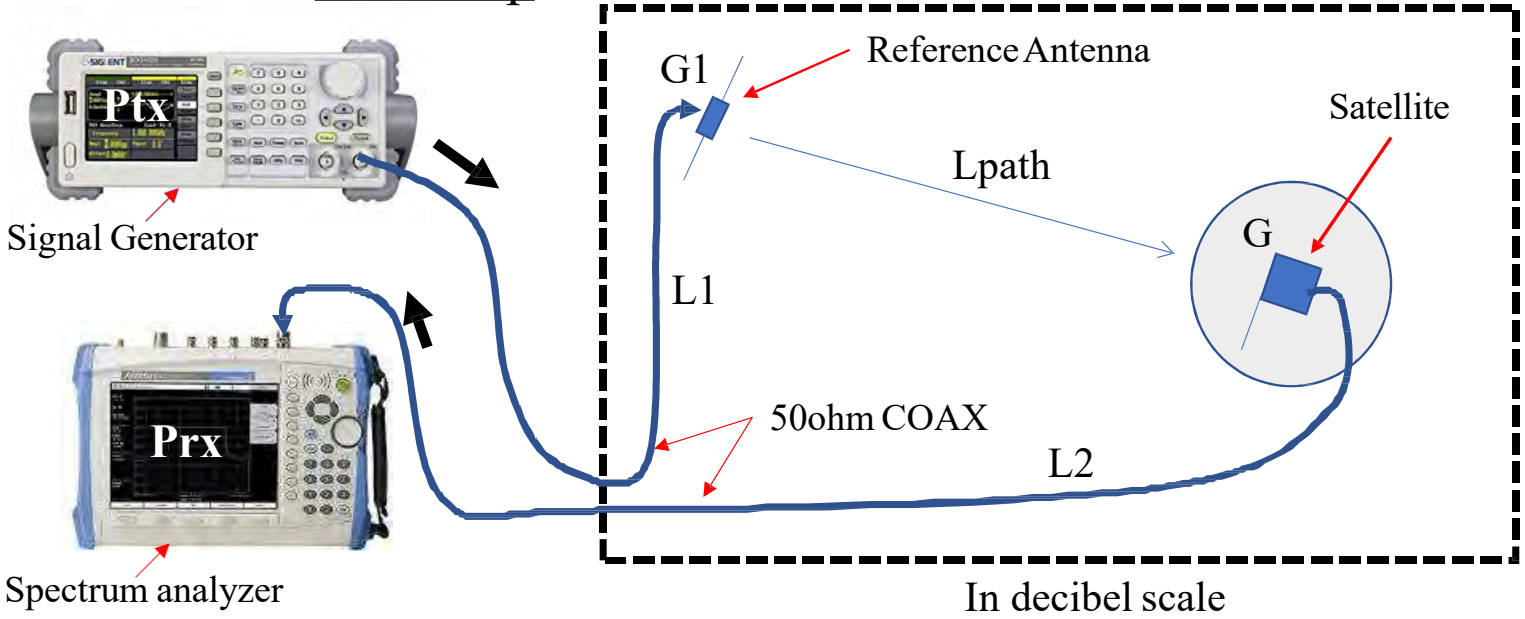


- **S11** parameters represents how much power is reflected from the **antenna**, and hence is known as the reflection coefficient (sometimes written as gamma: or return loss. If **S11**=0 dB, then all the power is reflected from the **antenna** and nothing is radiated

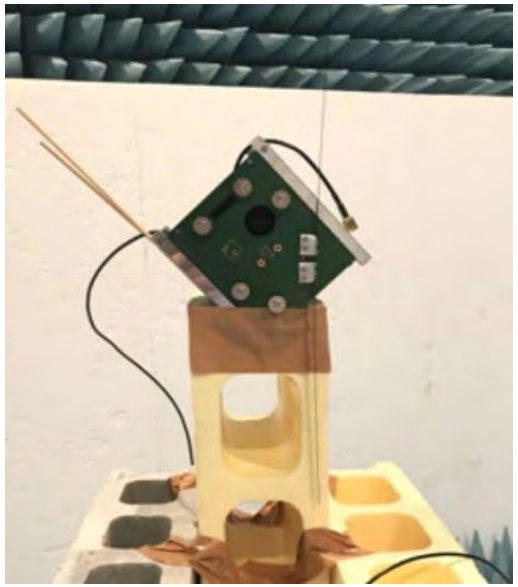
Ref. BIRDS-3

Test-2:Measuring the Dipole Antenna Radiation Pattern

Test setup



E and H plane axes definition is done



XY Plane = H-Plane
YZ Plane = E-Plane

Prs=> power received at the receiver
Pts=> transmitted power
L=> losses
G=> antenna gains

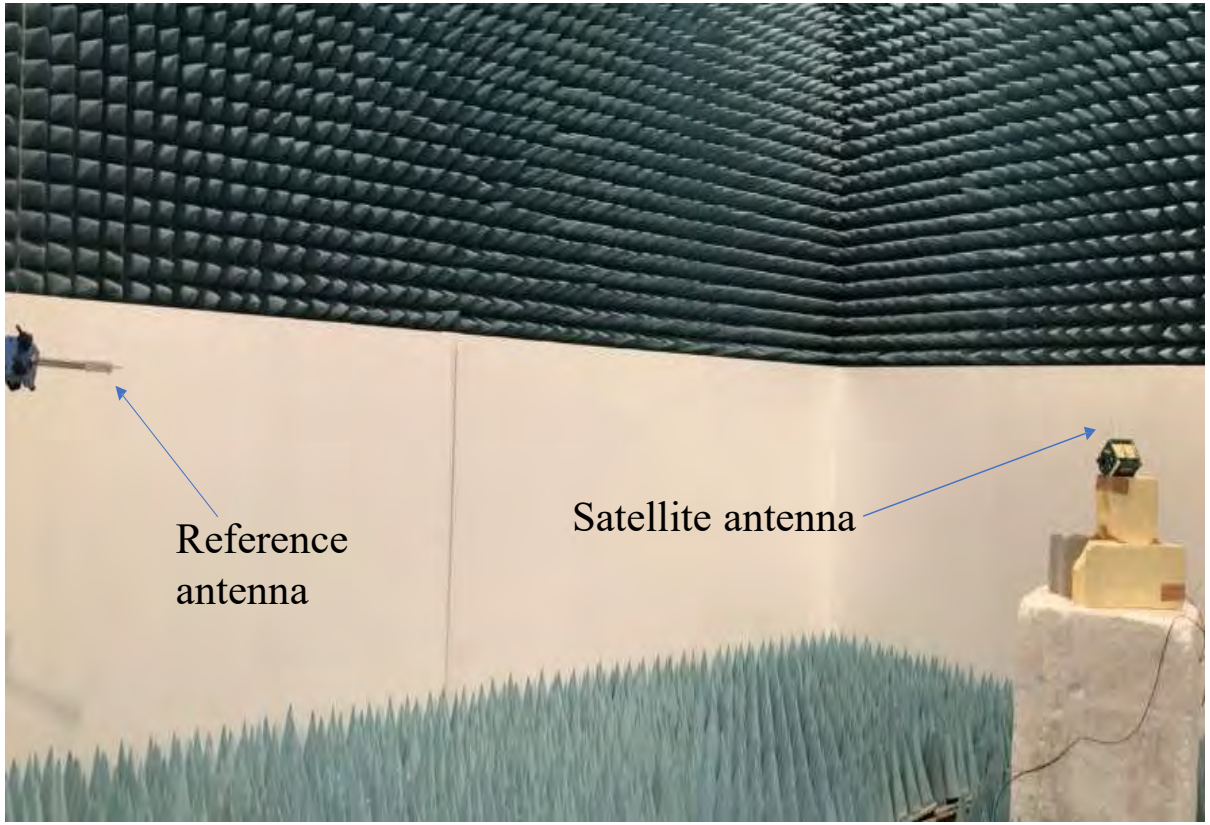
$$P_{rs} = P_{ts} - L_1 - L_2 - L_{path} + G_1 + G$$

H-Plane = Magnetic field Plane
E-Plane = Electric field Plane

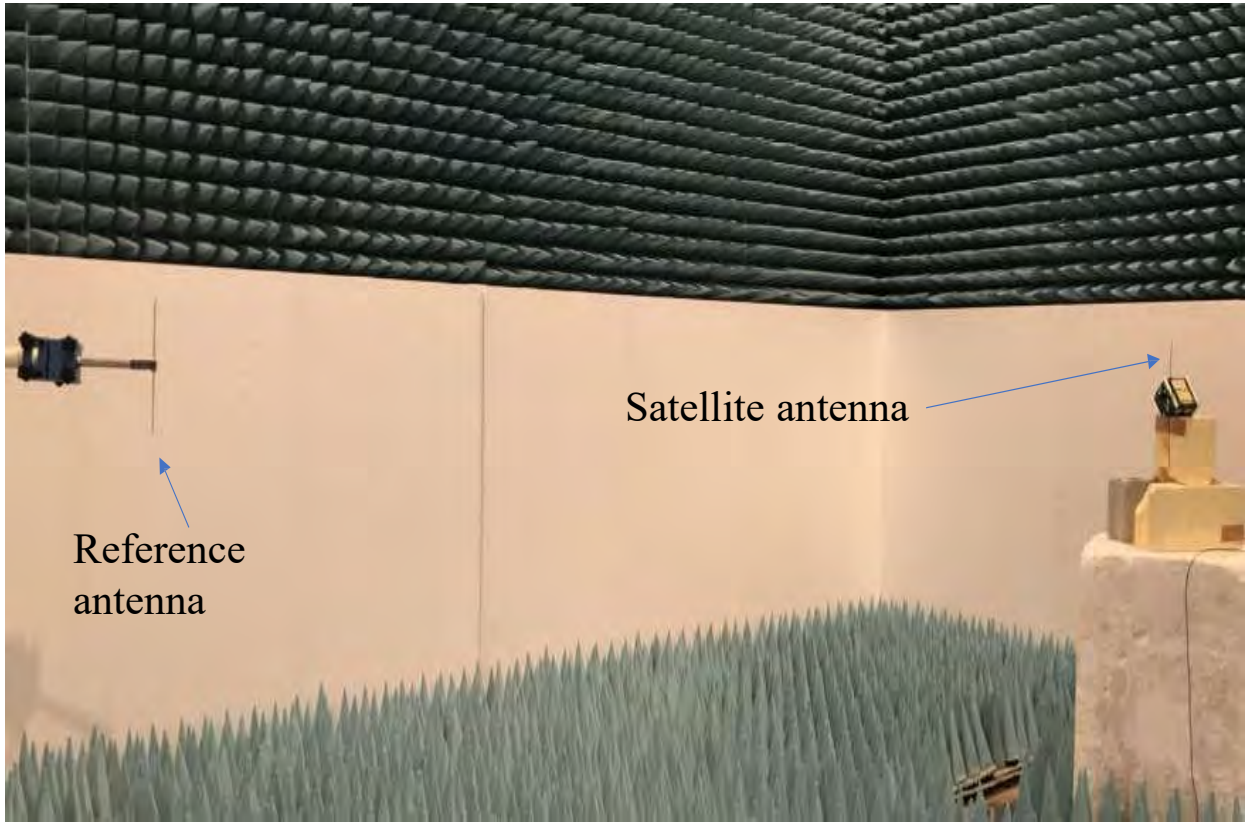
Ref. BIRDS-3

Measuring Dipole Antenna E-Plane and H-Plane Radiation Pattern

- In this case, reference antenna and satellite antenna are in horizontal orientation and the turning table is rotated to get the E-plane radiation pattern.



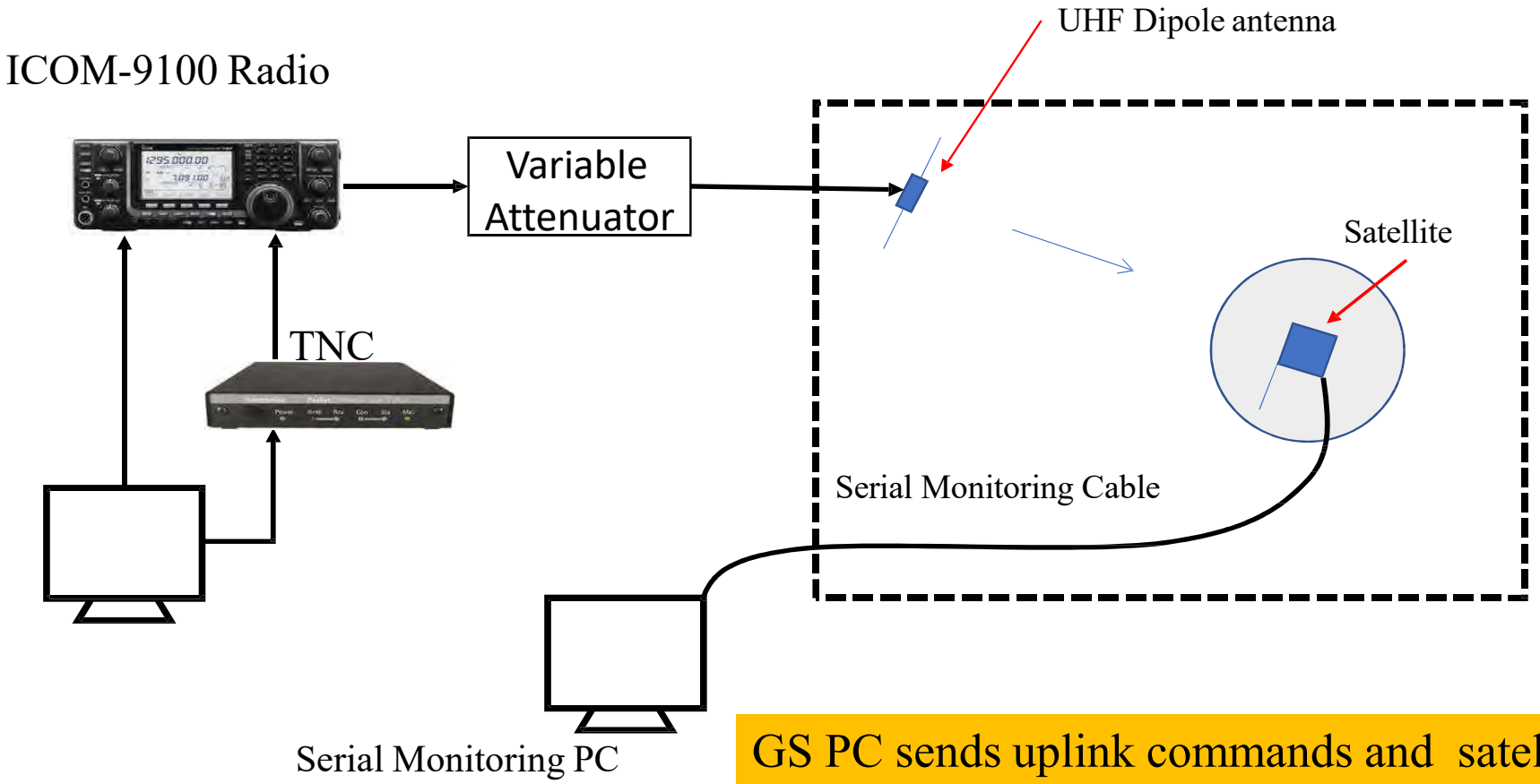
- In this case, reference antenna and satellite antenna are in vertical orientation and the turning table is rotated to get the H-plane radiation pattern



Ref. BIRDS-3

Test 3: Measuring UHF TRX Sensitivity with a Radio Setup

Test Setup

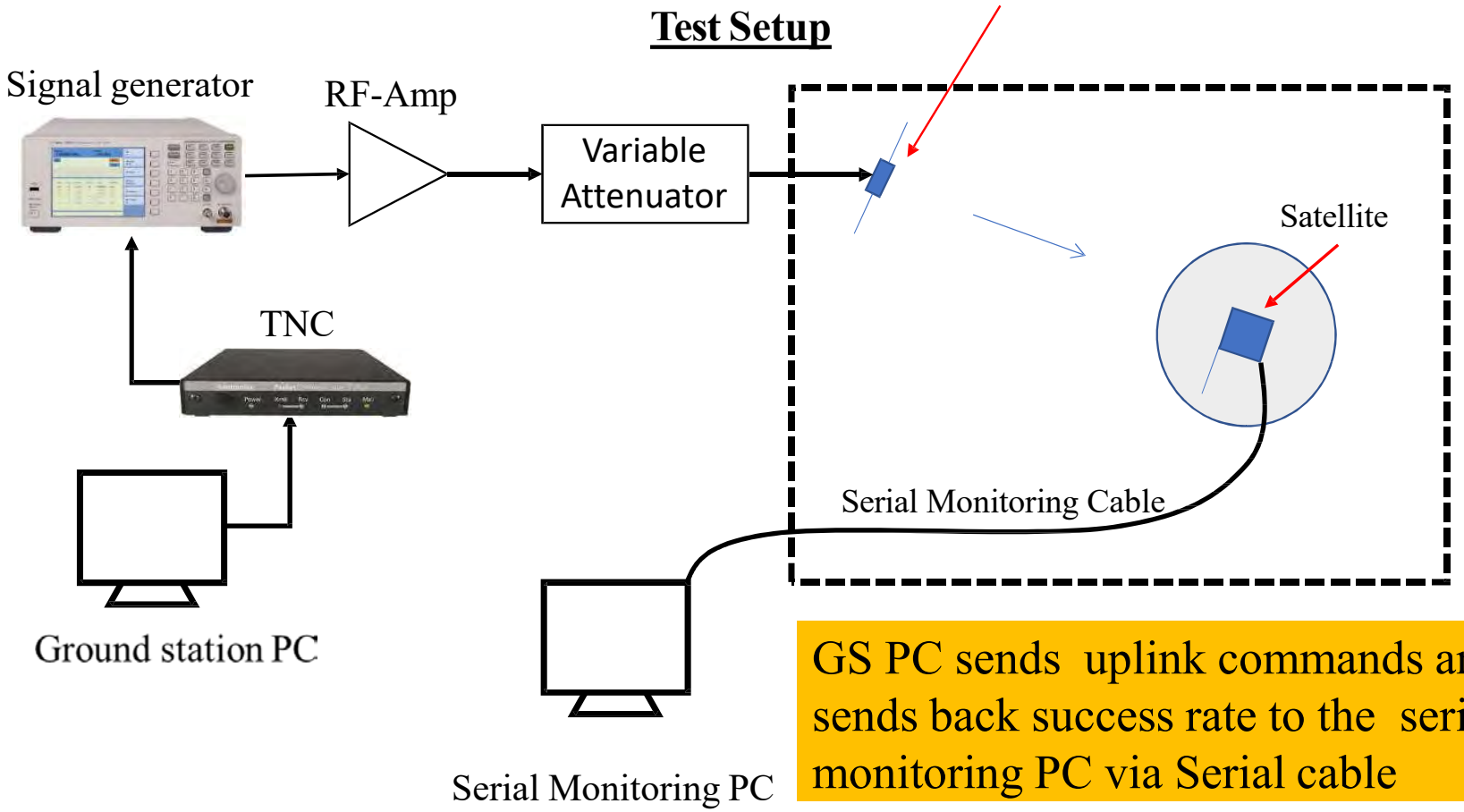


- **Receiver sensitivity** is the minimum power level at which the receiving node is able to clearly receive the bits being transmitted.

GS PC sends uplink commands and satellite sends back success rate to the serial monitoring PC via a serial cable

Ref. BIRDS-3

Test 4: Measuring UHF TRX Sensitivity With a Signal Generator Setup



GS PC sends uplink commands and satellite sends back success rate to the serial monitoring PC via Serial cable

Ref. BIRDS-3

Image Classification Mission (IMG-CLS)

By: Keenan Chatar

09/Mar./21

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

Image Classification and Segmentation

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

- End Users:
  1. Developers
  2. Government stakeholders
  3. General Public
  4. Education departments

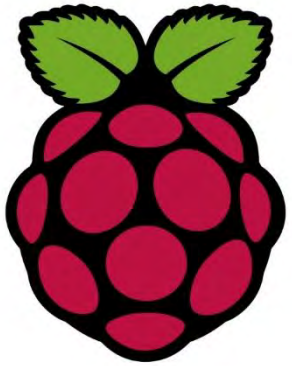
Software Environment

- Google Colaboratory
  - Multiple users can edit/share
  - Cloud computing
  - Easy versioning using GitHub
  - Free
- Juypter Notebook
  - Used in Google Colab
  - Store in Google Drive
- TensorFlow/Keras
  - Easy to use
  - Easy to install

Hardware Environment

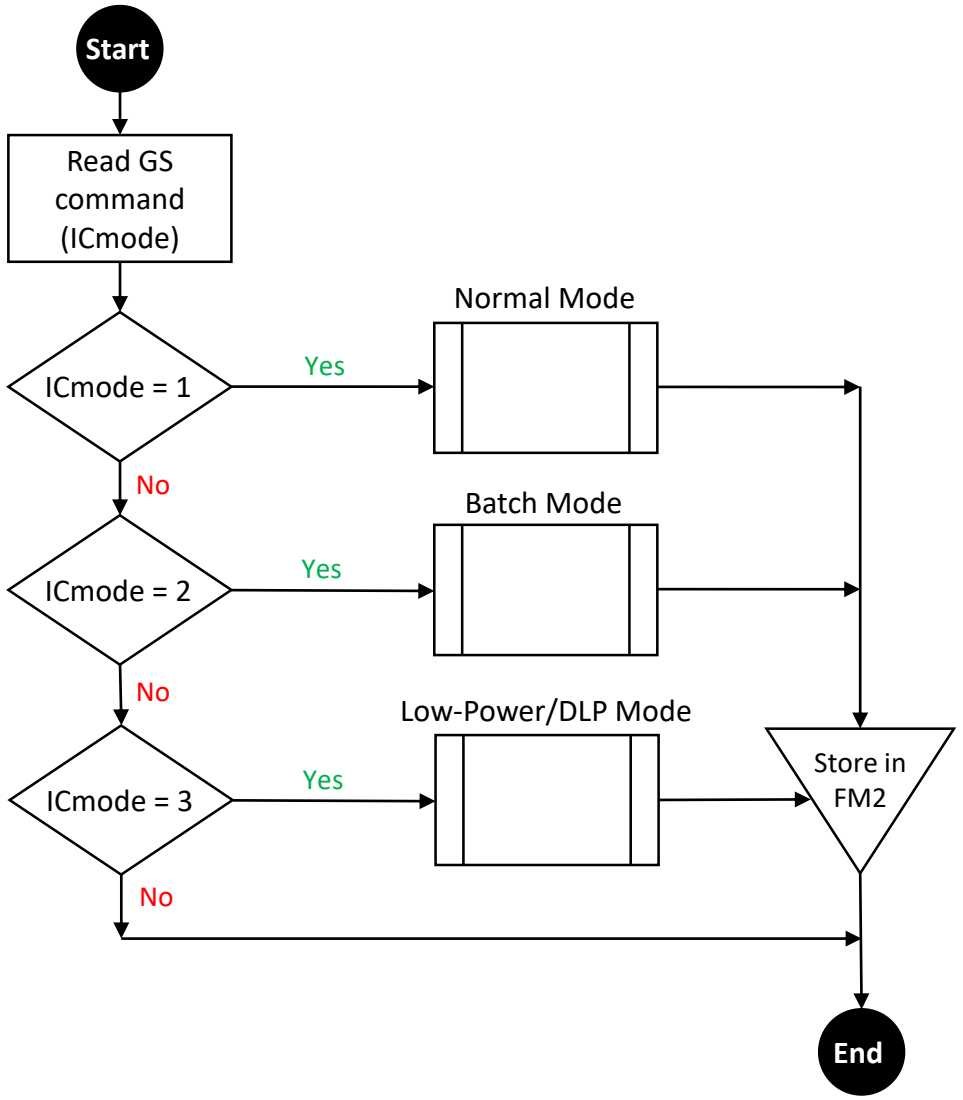
- Development Laptop
  - Acer Predator Helios 300
    - Intel i7-9750h, 2.6Ghz, 6-core CPU
    - Windows 10 OS
    - 16Gb RAM
    - NIVIDA 1660Ti Graphics Card
    - 512Gb SSD

- Microcontroller
  - Raspberry Pi Zero W
    - Broadcom BCM2835, 1GHz, single-core CPU
    - Raspbian OS
    - 512MB RAM
    - Removeable SD card storage



Mission Modes

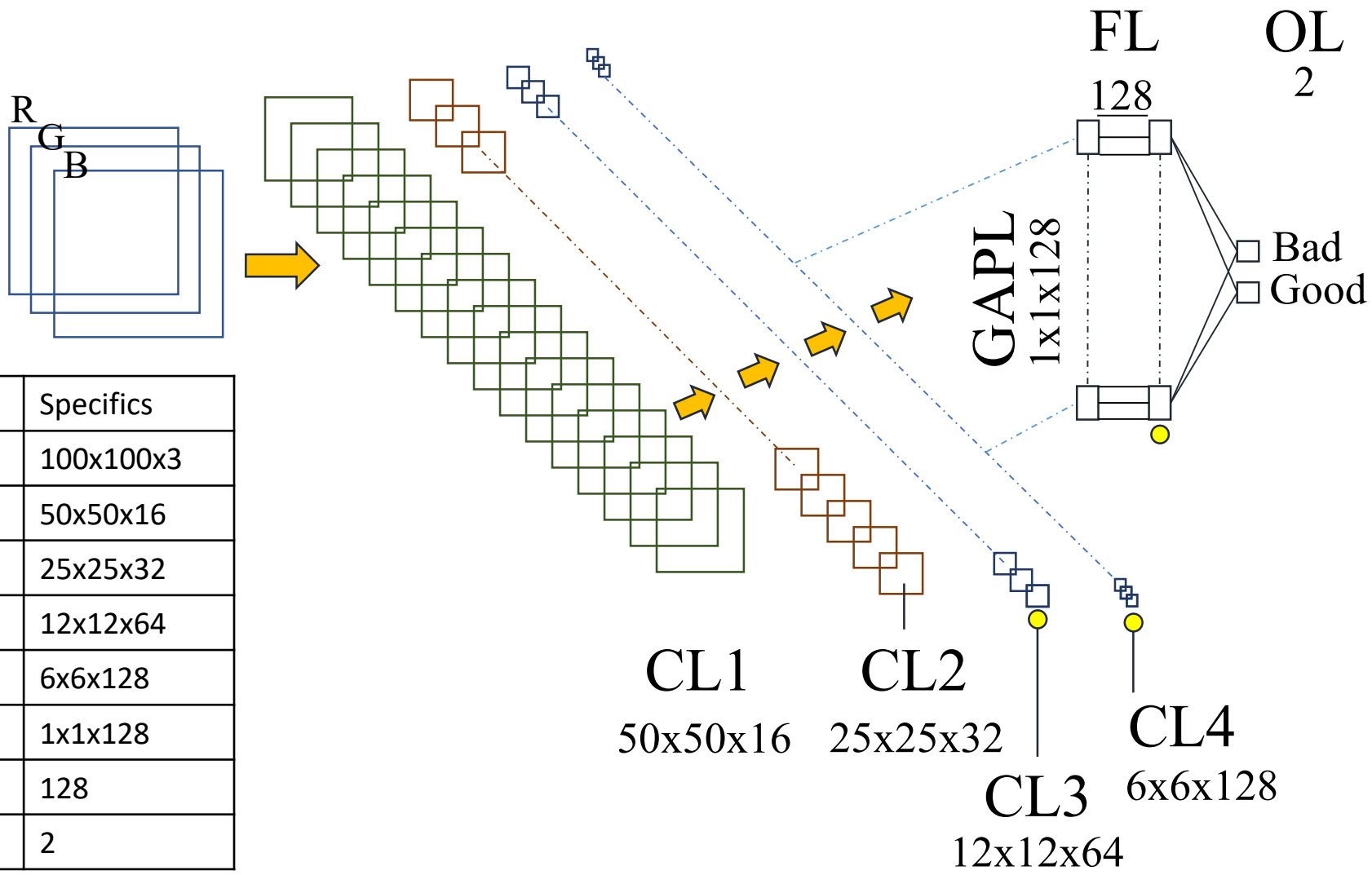
- Three Primary Modes:
  - **Normal Mode** – Capture image, classify contents, store to memory
  - **Batch Mode** - Capture a series of images, classify contents, store to memory
  - **Low Power/DLP Mode** – Turn off camera, allow DLP to perform tasks, store data to memory



Neural Network Architecture

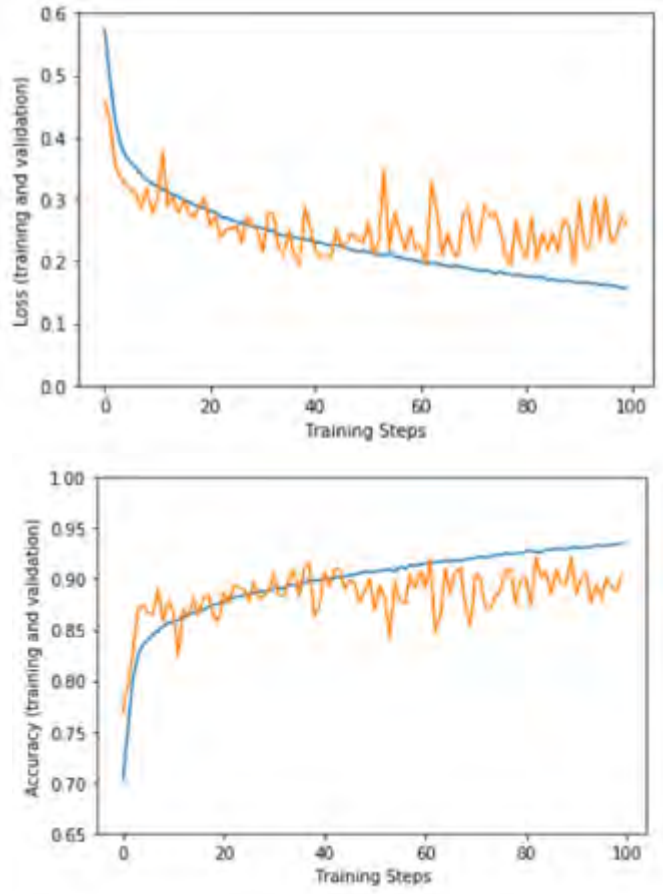
- Convolutional Neural Network
  - Simple
  - 8-layer Architecture

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



Training and Accuracy

- Binary Classification
- Gradient Descent Training
- Accuracy: ~90%



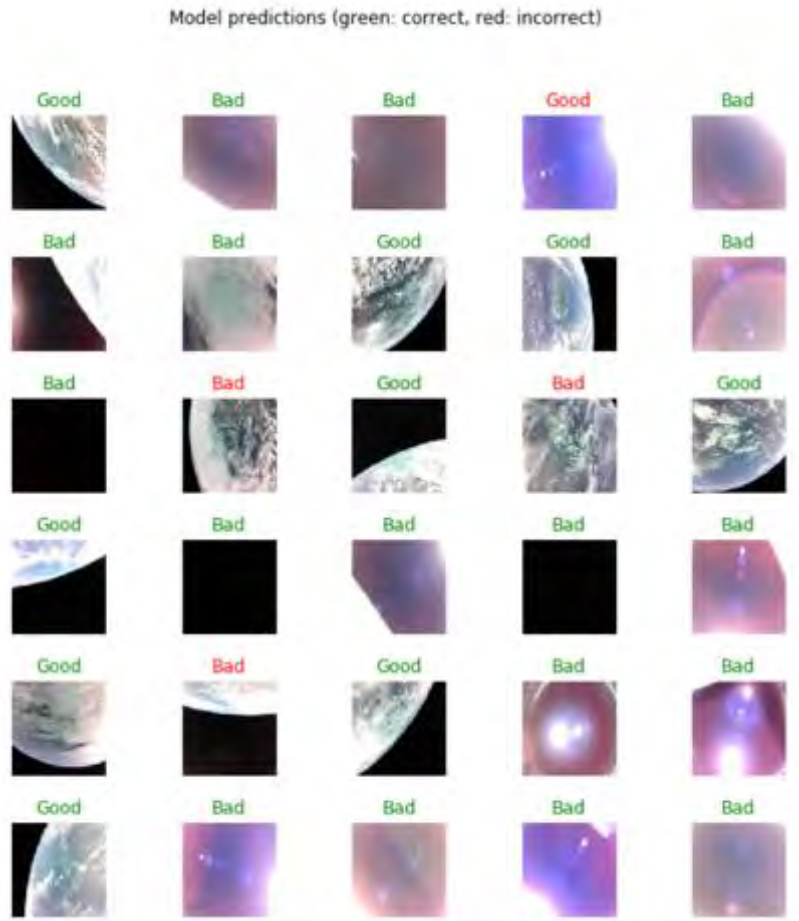
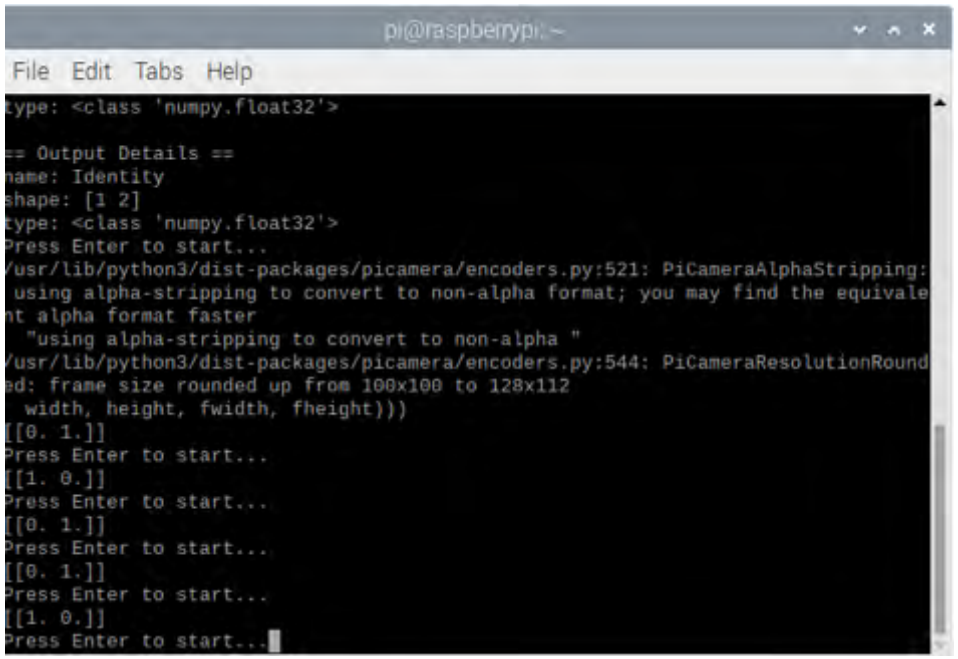
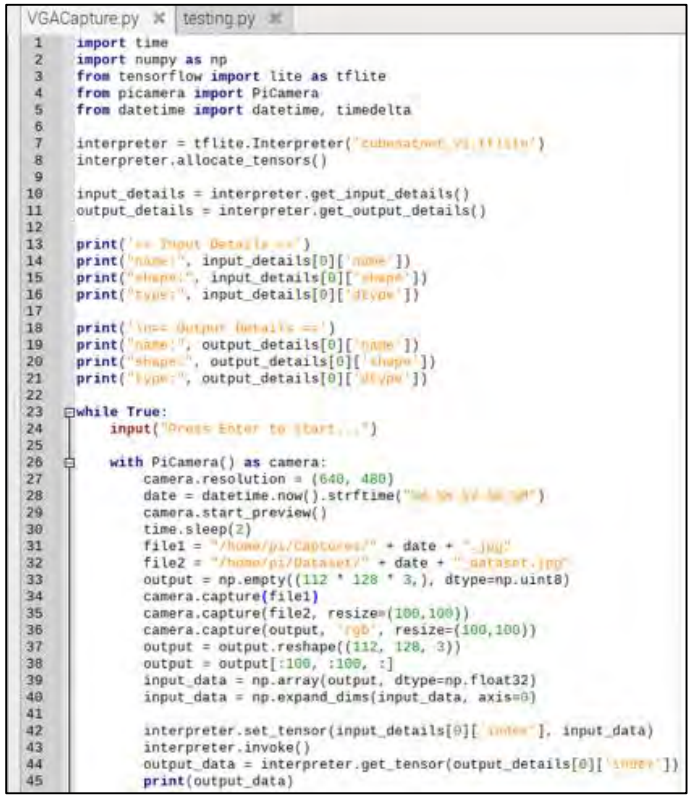


Image Classification

- Classify images captured in space as a "Good" image or a "Bad" image





[0, 1]

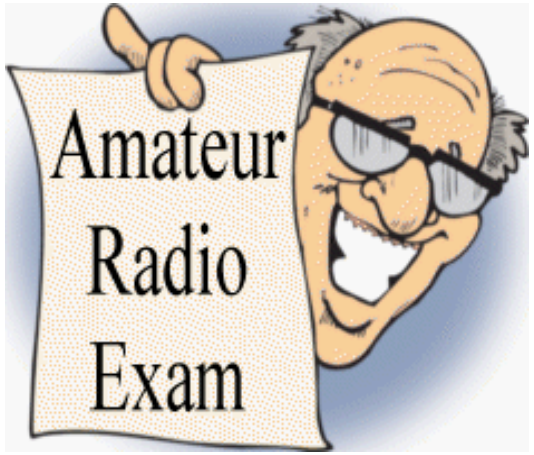
[1, 0]

[1, 0]

[Good, Bad]

37. BIRDS-5: Amateur radio exam at Beppu

HAM RADIO AMATEUR EXAM



By : Victor Mukungunugwa

BIRDS-5 Project Manager

9/March/2021

THE TEAM HIRED A BIG CAR TO TRAVEL TO OITA PREFECTURE

2017 New TOYOTA NOAH 2.0L 4WD, 7 Seater (This is not an advertisement)

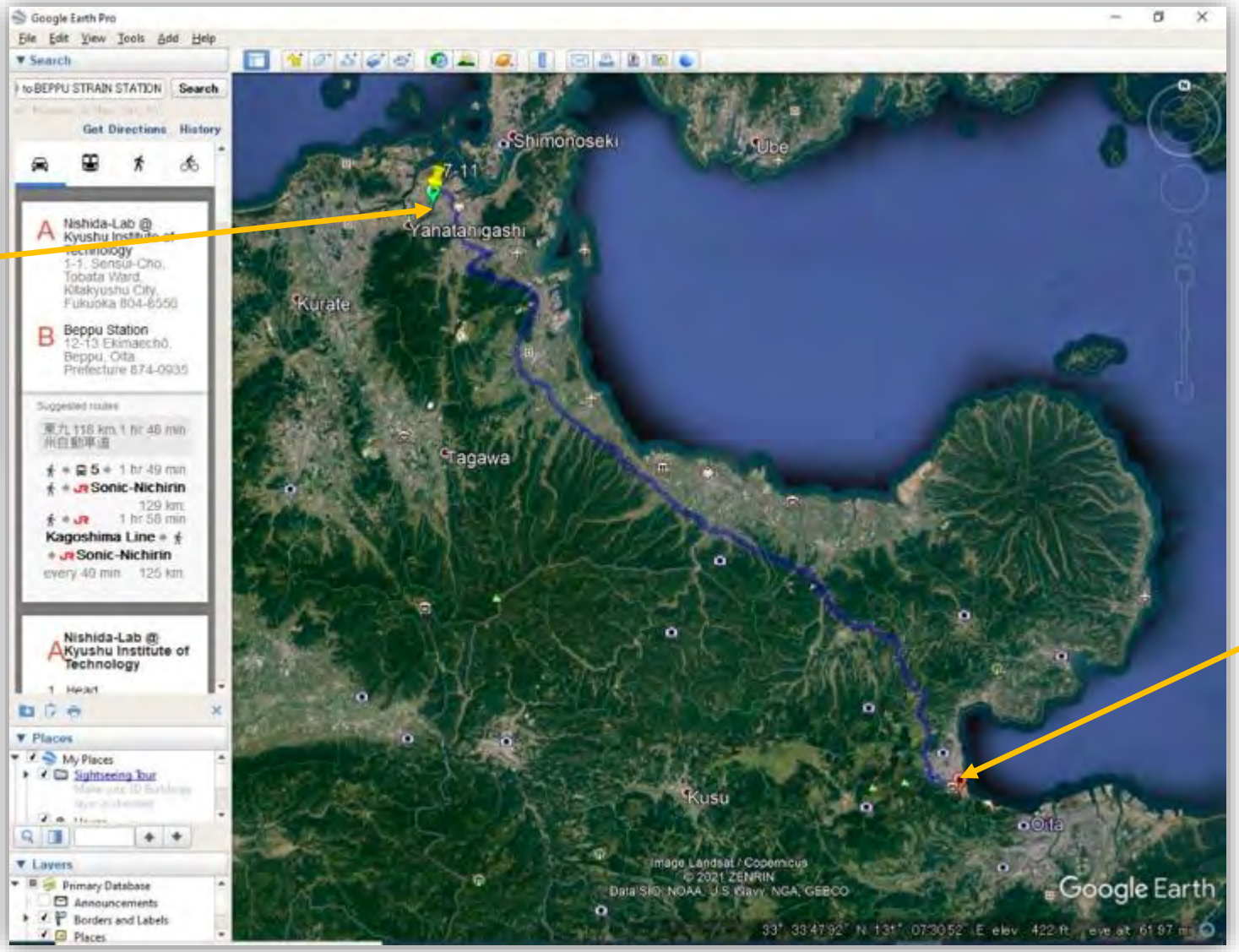
Members

1. Yukihisa Otani
2. Nyamukondiwa Ramson
3. Chatar Keenan
4. Mukungunugwa Victor
5. Kuhamba Timothy
6. Areda Eyoas
7. Cordova Rodrigo

Yukihisa Otani, the driver

THE JOURNEY OVERVIEW

Members met at the 7-Eleven convenience store near Kyutech



The Exam auditorium

It is 125km from Kyutech to the exam auditorium in Beppu, Oita

STOP OVER AT A VIEW POINT

Group photo at the view point taken by Otani

Oita Sea View point

Oita Sea View point

The team made some stopovers during the 125km journey and took many photos of the beautiful views for Oita.

A GOOD LUNCH BEFORE THE EXAM

The team having lunch

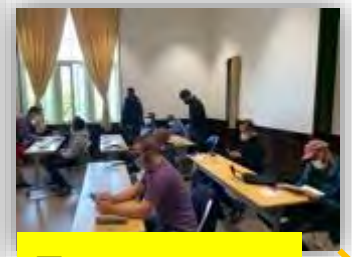
Restaurant view from outside

Tori-ten

TEAM RECEIVING EXAM BRIEF BEFORE EXAM

The team was evenly distributed and COVID 19 rules were observed

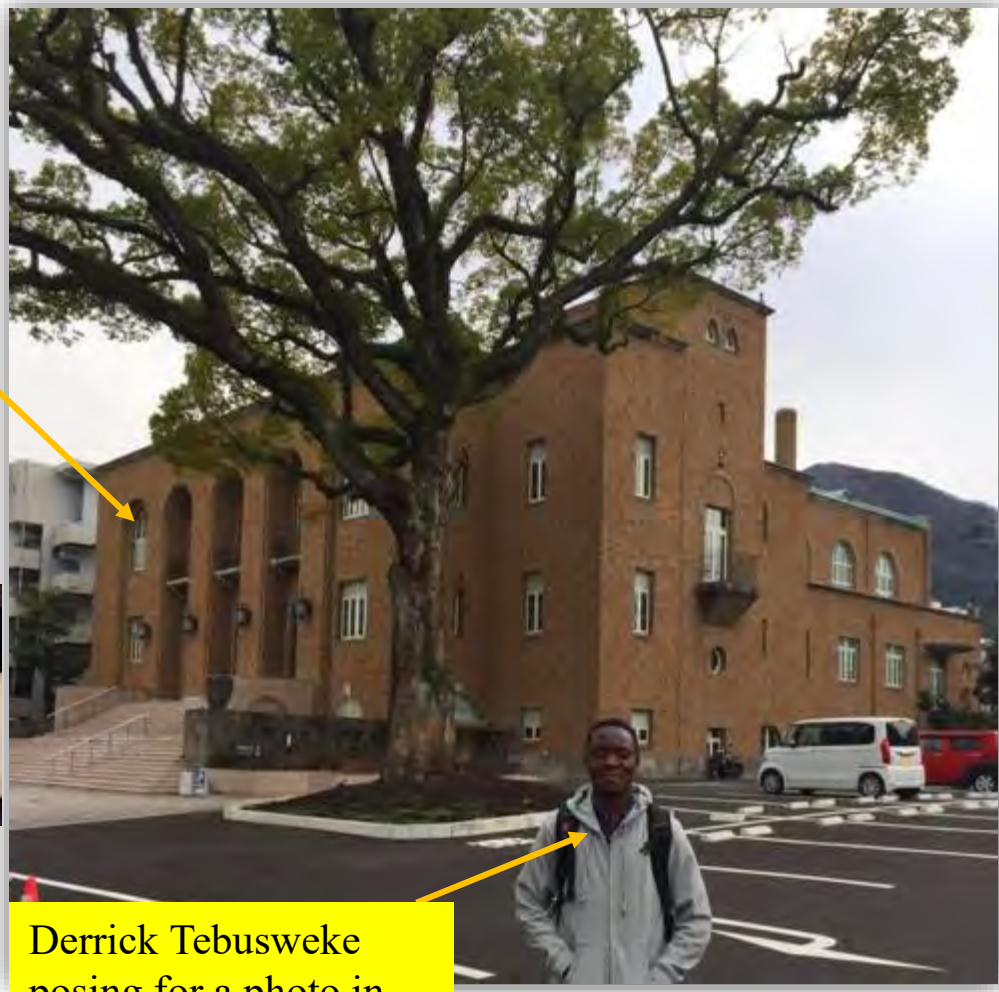
- Wearing masks
- Social distancing
- Ventilation by opening windows



Exam room

Exam Aids

- Pencil
- Calculator
- Rubber



Derrick Tebusweke posing for a photo in front of the auditorium

Hot springs (*7 Hells of Beppu*) and pudding moments

Hot spring in front of the restaurant where eggs are boiled and pudding is heated

The team enjoying the famous Jigoku-mushi-purin

One of the 7 HELLS OF BEPPU, JAPAN

Jigokumushi Purin means (Hell-Steamed Custard)
The custard is steam cooked using the local hot spring water and saved with a sauce. It is famous in Japan and mainly made in Beppu because there are lots of hot springs. The biggest of them all are called the "7-Hells". The team could not visit them due to COVID 19

Beppu,Oita

References

- https://tcares.net/event/ham-radio-exam-session-nov-2018/
- https://warmcheaptrips.com/en/visiting-the-hells-of-beppu/
- https://www.beyondthebay.co/japan/7-hells-beppu

Winning a Japanese Speech Contest Award

By : Fahd MOUMNI

18/03/2021

About the Japanese Oshaberi Speech Contest

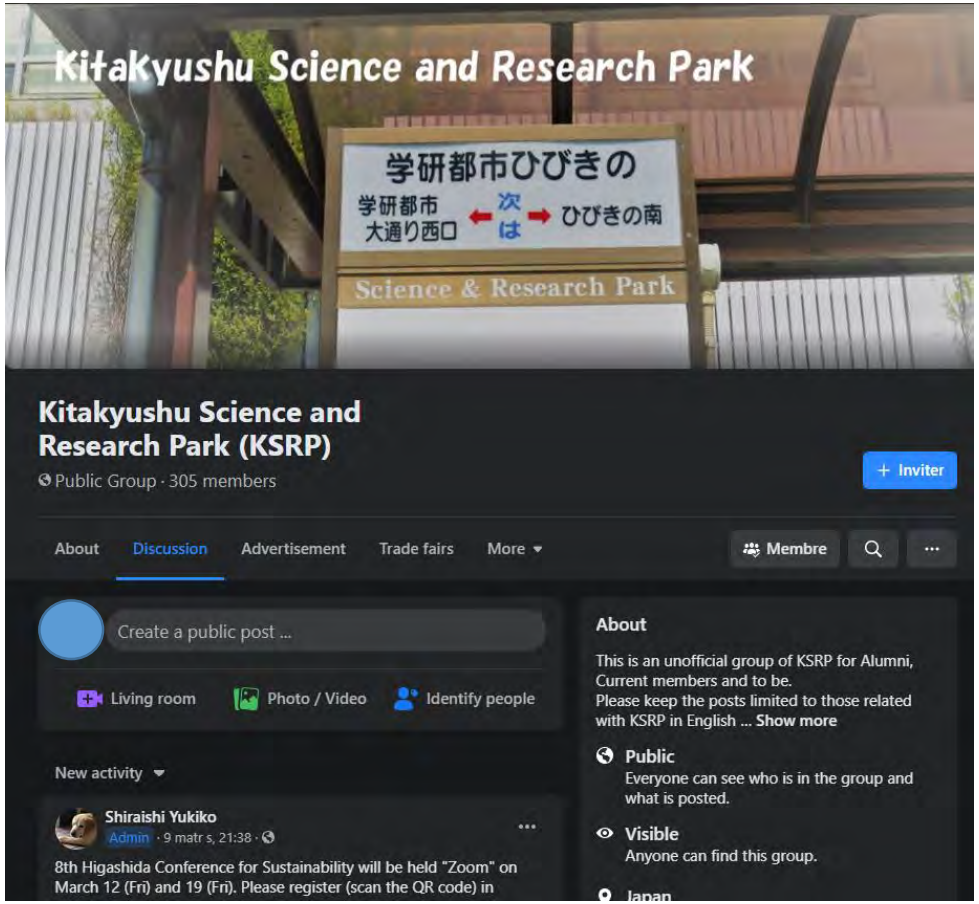
- The Japanese Oshaberi Speech Contest is a competition organized by the Kitakyushu International Association.
- This year (2021), the 11th edition was organized.
- The event is annual and involves many international students from all around the City of Kitakyushu.
- All subjects presented are chosen by the participants and taking part of the contest is free of cost !
- The contestants who reach the podium are awarded with special prizes !

The Official Poster of the 11th edition
https://www.kitaq-koryu.jp/vn/topics/event/tuyn-thi-sinh-tham-gia-cuc-thi-oshaberi-bng-ting-nht.html

Kitakyushu International Association website : https://www.kitaq-koryu.jp/en/

How did I get to know about it ?

- I always looked “aggressively” for a way to learn Japanese even if I cannot invest much time to study it.
- As we have no events or initiatives, outside of classes, for international students to improve our japanese in Tobata Campus, I went to look for more opportunities in the Wakamatsu Campus.
- I met Ms. Shiraishi Yukiko from the FAIS office (Foundation for the Advancement of Industry, Science and Technology) who organizes classes and other events targeting foreign students who are willing to learn.
- Being from Tobata, classes were not an option for me, but thanks to the pandemic, I was able to participate every Friday night at the “Nihongo Circle”, via Skype, where Japanese teachers and international students have conversations about anything and everything.
- From time to time, we would get notified about events through the group’s LINE (a popular social media in Japan), Facebook, or through those Friday nights discussions.
- One of those nights we got the information about the Contest…

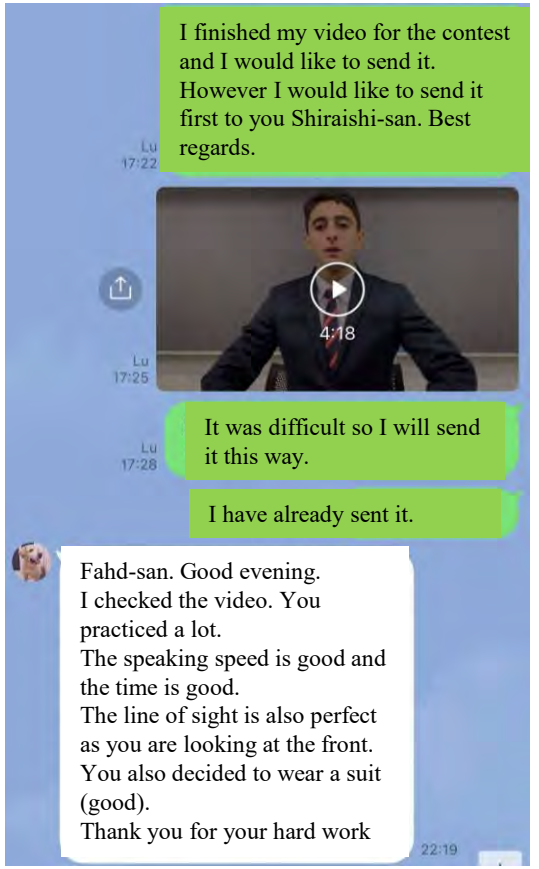


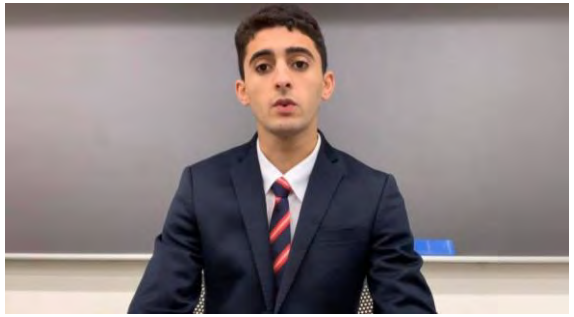
Everyone can already access the Facebook Group ! Shiraishi-san always posts on this same group

How did I prepare for it ?

- Truth is, I mostly followed Shiraishi-san's guidelines every week : It is difficult to organize yourself alone to plan for it, but if you were to attend all those Friday meetings, then you would get reminders, advices, corrections and other kinds of help.
- The rules were that the speech should last 4 min exactly, that it would be a recording instead of a live diffusion due to the pandemic, involving each participant to focus on the camera. Each participant should know his speech by heart when presenting it. There was no dress code but it is always a good idea to wear a suit!
- I first wrote my text in English, translated it with the help of a friend and submitted it to the Japanese sensei of the Nihongo Circle for corrections.
- After verification, 30 minutes were always kept to read or present the speeches in front of other students via Skype. With time and practice, words come out of your mouth easily!
- The training lasted from the end of December to mid-February as the video had to be submitted to the association.
- I had to repeat my 4-min video for at least 7 hours in a row in different places to get at least one version with no mistakes or outside perturbation !!!

At first I went to the library (supposedly quiet), but I had to move sooner than I expected !





I found an empty room in one of the research buildings and I was given the permission by the student section to use it. I just could not expect to spend 6 hours in that same room !

← Shiraishi-san approving the official video that I sent to the association.

What were the results ?

- I secured the 3rd place of the podium !!!
- Representing my country, Morocco, but also our laboratory LaSEINE from Kyutech's Tobata Campus, I could not be prouder !
- In fact, competing with more prepared students has not been an easy task but to quote Ibukun-senpai "you just have to believe in it" !
- I was able to receive an "Excellence Award" from the hands of Ohshita Naruhiro-sama, the Executive Director of the Kitakyushu International Association ! He was surprised by my level as I explained that I came in October 2019 !
- I also received another little reward (that I will keep secret) for my efforts.
- LAST but NOT LEAST : I am inviting every international students, whether from LaSEINE or any other institution to make at least a minimum effort towards learning Japanese or any other language ! Joseph Ofosu-senpai once said :"it only requires 15 minutes a day"… he is right! I can see the results of applying his valuable advice !
- As I like to say "Languages are the KEY of the WORLD" so please, do your best to understand it and even know more about YOURSELF!

Receiving my awards from Ohshita-sama, Executive Director of the *Kitakyushu International Association*

More pictures !

In Ohshita-sama's office, talking about my experience of learning Japanese and all the challenges that I faced through the whole process.

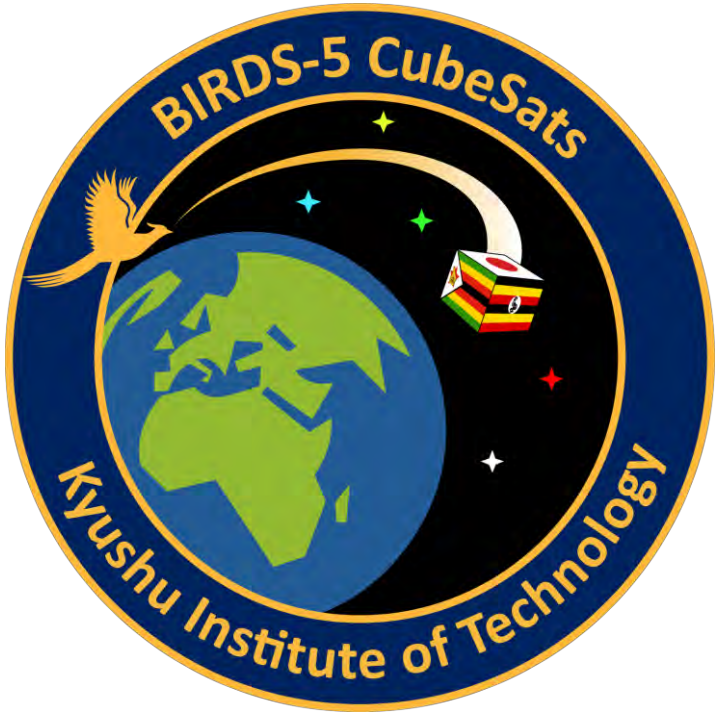
Check this link for more details: https://www.linkedin.com/posts/fahd-%E3%80%8C%E3%83%95%E3%82%A1%E3%83%BC%E3%83%89%E3%80%8D-moumni-%E3%80%8C%E3%83%A2%E3%83%A0%E3%83%8B%E3%80%8D-038777143_languages-are-the-key-of-the-world-activity-6775712616020099072-iCwP

The « Excellence Award » (right) and the other special reward (left)

Getting thoughtful and more expressive when explaining how Japanese and Moroccan cultures can be similar in many ways.

End of BIRDS-5 reports for this month

Thanks to Fahd for the compilation work.
Also thanks to all contributors.
The quality is on the rise.
- Editor



End of this **BIRDS Project Newsletter**

(ISSN 2433-8818)

Issue Number Sixty-Two

This newsletter is archived at the BIRDS Project website:
http://birds1.birds-project.com/newsletter.html

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.