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

New Photo →

Members of BIRDS -1, -2, -3, -4 and -5, on 30-Oct-2020 in front of the lab building

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

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

ISSN 2433-8818

BIRDS Project Newsletter

Issue No. 58
(23 Nov. 2020)

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

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**

Kiira Motors Corporation Electric buses ‘Made in Uganda'. The state-owned nascent car manufacturer Kiira Motors Corporation is launching a concept of battery-electric bus, named Kayoola EVS. Two Kayoola EVS buses were built for both piloting and validation, they have each covered over 2000 km. The production facility that is planned to be completed in June 2021 shall have an installed capacity of 5000 vehicles per annum when fully operational. https://www.kiiramotors.com/kayoola-evs/

* Submitted by the BIRDS-5 Team of Uganda (Bonny, Edgar, and Derrick)

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

End of Table of Sections

Christmas Market
of Hakata Station
on
17 November 2020
[photo by G.Maeda]

http://christmas-market.jp/

JSPS Reminder

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

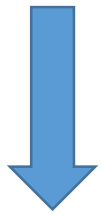
This work was supported by JSPS Core-to-Core Program, B. Asia-Africa Science Platforms.

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

01. International Workshop on Lean Satellite -- 2020

Observers of this workshop should register. Anyone can register.

To see the rest of this, please go here



International Workshop on Lean Satellite – 2020

A "lean satellite" is a satellite that utilizes non-traditional, risk-taking development and management approaches – with the aim to provide value of some kind to the customer at low-cost and without taking much time to realize the satellite mission. These approaches differ significantly from traditional approaches to satellite development. The term "lean satellite" was born during the activities related to the international standardization of small/micro/nano/pico satellite testing starting from 2011. There was no clear definition of the terms "small", "micro", "nano", "pico" that was agreeable to all concerned. So to capture the essence of development and management philosophy -- rather than categorizing based on mass or size -- the term "lean satellite" was adopted.

Every year since 2011, an international workshop to discuss various aspects of lean satellites has been held. The purpose of the workshop is to further promote the study of lean satellites. To deliver the satellite values to stakeholders with affordable cost and permissible delivery time, there are various issues to be examined further, such as standards, testing, operation, manufacturing, interface, project management, etc. Since the beginning of the series, the workshop has focused on standards. It produced two ISO documents, ISO-19683 "Space systems — Design qualification and acceptance tests of small spacecraft and units" and ISO-TS-20991 "Space systems -- Requirements for small spacecraft". Following the workshop in 2019, this year's workshop will put an emphasis on CubeSat interface standardization. There is a strong need to standardize the interface not only among CubeSat components but also between a CubeSat platform (bus) and mission payloads to shorten the satellite delivery time and to promote international trade and collaboration.

https://lean-sat.org/2020_nets-regist/

02. Outreach to promote the benefits of starting a space industry in emerging countries

Dr. Rodrigo Cordova, one of our post-doctorate researchers, gave an online seminar called "**CubeSat satellites as detonators of the regional space industry",** in Spanish, which was promoted in Mexico and Latin-America.

People from several countries joined the seminar, including **Mexico, Peru, Venezuela, Costa Rica and Argentina**

*"Such events should be made constantly to **convince governments to start or boost the space industry** in emerging countries". Rodrigo, 2020.*

OLAYINKA'S WORLD

COLUMN NO 21

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

Olayinka's World
...in space to make a difference

COVID-19 INTERVENTION FOR INTERNALLY DISPLACED PEOPLE'S (IDP) KIDS

The IDP Children Astronomy Outreach Project aims to use astronomy as a tool to counsel, heal and inspire children that have been displaced due to terrorism in Nigeria. This project has identified astronomy as a tool because it is one of the oldest natural sciences and for the fact that the children are used to being taught in an informal setting, understanding the universe can be passed across suitably to the children. Astronomy would prove more effective than other subjects that are based on a structured curriculum.

With the advent of the COVID-19 virus pandemic, AWBNigeria sought to support the IDP camp in terms of sharing knowledge of the virus, building a hand wash station, distributing facemask and sanitizers and also equipping the solar powered learning hub with a desktop computer and android tablets. AWBNigeria in her Covid-19 intervention to the IDP children distributed 300 facemasks, 300 hand sanitizers, relief & cleaning materials, also upgraded the Learning Hub that was built one year ago with 5 android tablets, 1 desktop computer.

Covid-19 Intervention for IDP Kids (Nigeria)

04. Water measuring instrument for remote locations (store and forward application)

太陽光で動く水量計

東芝系 水力発電向けに投入

東芝子会社の東芝エネルギーシステムズは、山あいなどにセンサーを設置して雨量や河川水位のデータを収集するサービスで、太陽光発電で動き続ける無線機器を新たに投入する。水力発電事業者などの需要を想定しており、電池交換の手間が省けデータ収集の作業負担を軽減できる。再生可能エネルギーへの関心は

現在の機器は電池で駆動している。山あいに設置するため、電池交換は手間がかかる

日本経済新聞; 2020.11.06

As electronics continue to get cheaper and yet deliver higher performance, we can expect more field instruments such as the Toshiba one shown at the left. It runs on solar power, and it collects water-related data in the field.

However, this problem remains: *How to get the acquired data from the field to a central data center for analysis.* This can be a role for CubeSat constellations.

05. October issue of “Highlighting Japan” – from the government of Japan

#149 October 2020

THE COLORS OF JAPAN

The colors that exist in nature stir a variety of emotions in Japanese people. In this month’s Feature, we introduce some of the quintessential colors of Japan and look at some of the ways in which natural colors and the emotions they engender are used and expressed in the arts.

https://www.gov-online.go.jp/eng/publicity/book/hlj/index.html

FEATURES

Kimono Combinations: The Seasons in Layers of Silk

Gold, Silver, Platinum and Black: The Timeless Art of Makie

A Candy-Colored Residence

06. Japan's Ambassador to Paraguay

19 女性

女性

日本経済新聞, 26 Oct 2020

折れないキャリア NIKKEI 2020. 10.26

駐パラグアイ大使 中谷 好江さん

外交の基本 子育てに通じる

なかたに・よしえ 東京外大卒。1983年外務省入省。中南米政策を中心に手がける。2020年9月から現職。

Nakatani Yoshie

Japanese ambassador to Paraguay. Earned her degree in Spanish from the Tokyo University of Foreign Studies in 1983 and joined the Ministry of Foreign Affairs. Attended the Diploma Spain in 1986. Worked in MOFA's Second North American Division in 1988–92, where she was involved in trade negotiations.

Served as the deputy director of the Japan Information and Culture Center at the Japanese embassy in Washington DC in 1996–98 and the OECD Tokyo Center in 2009–13. She has also held posts as envoy at Japanese embassies in Mexico and Paraguay, negotiator at the Affairs Bureau, and director of the Fisheries Division of the Economic Affairs Bureau. Married Ōtsuka Umio, a former Maritime Self-Defense officer and current Japanese ambassador to Djibouti.

Madame Ambassador: Japanese Envoy to Paraguay Nakatani Yoshie Talks Diplomacy and Female Empowerment

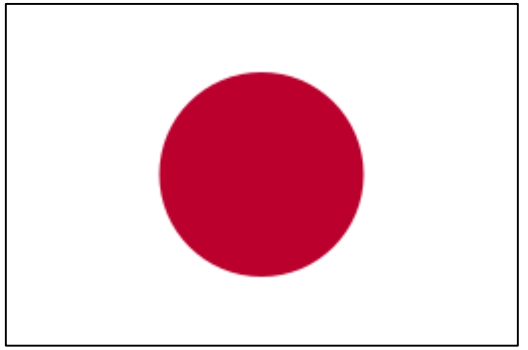
Oct 23, 2020

Nakatani Yoshie, Japan's top representative in Paraguay, is one of only five female Japanese ambassadors. We recently sat down with the veteran diplomat to talk about her start in the foreign service and how she balances career and family demands while serving her country.

https://www.nippon.com/en/people/e00176/#:~:text=Nakatani%20Yoshie%2C%20Japan's%20top%20representative,only%20five%20female%20Japanese%20ambassadors.

07. BIRDS-5: Uganda Team travels from Uganda to Japan (the big journey)

To study at SEIC
(Space Engineering Int'l Course of Kyutech)



The following travelogue was submitted to this newsletter on 5 Nov 2020. It was written by the BIRDS-5 Uganda Team (Bonny, Edgar, and Derrick).

They departed Entebbe Airport (Uganda) on 10 October 2020. They transited Addis Ababa (Ethiopia) and Inchon Airport (Korea). They arrived at Narita Airport on 11 October. Then they had to do quarantine near Narita Airport for 15 days.

The Send Off from Uganda

A fare-thee-well cake for the Ugandan team before departure

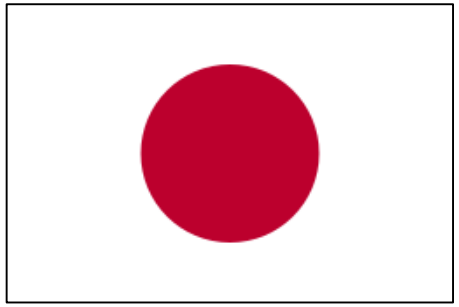
Bonny’s family members.

The three Ugandan engineers started their journey to Kyutech on 10 October 2020 right from Entebbe International through Addis Ababa, Seoul to Narita.

There was some wiping of tears escorts.

Moments of last instructions

Destination: Japan

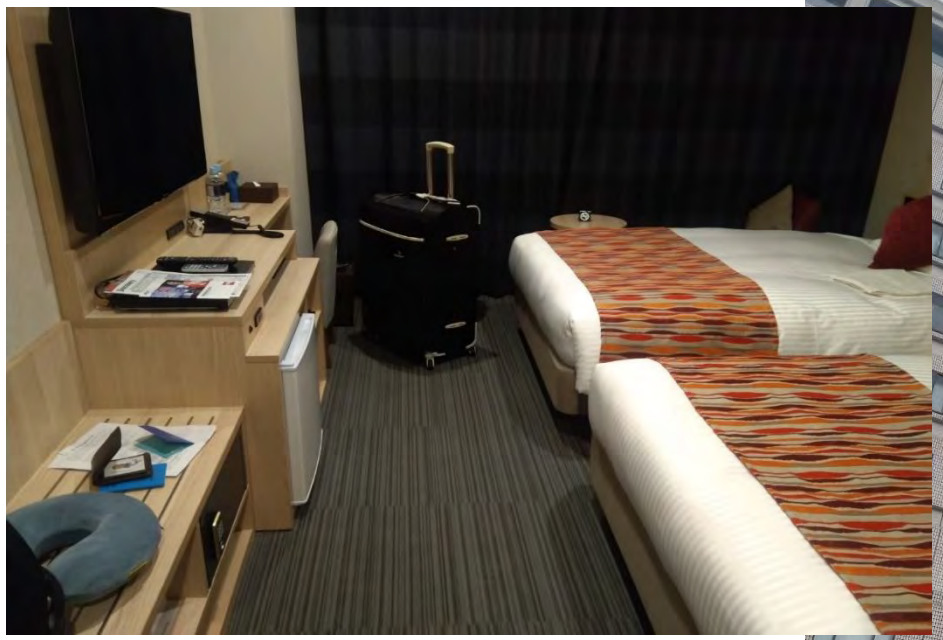


After touchdown at Bole International, Addis Ababa, Ethiopia, on 10th October 2020.

The team arrived at Narita Airport at 8:15 pm

The team arrived at Addis Ababa waiting for the next flight to Seoul (South Korea)

HOTEL MYSTAYS Premier Narita



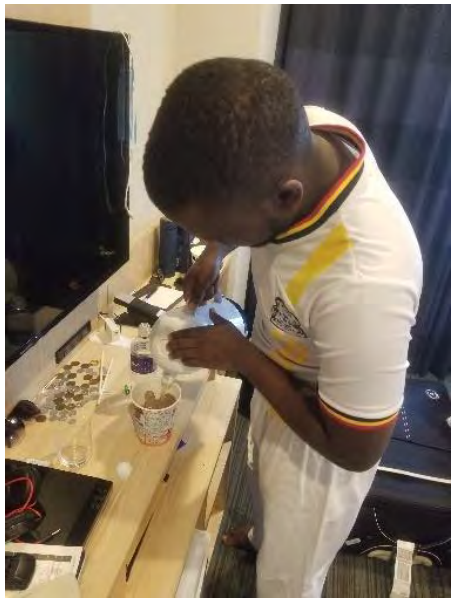
This is one of the best hotels around Narita Airport.
Each of us checked in to Double Room comfort.
To minimize contact with room service personnel, Room service was done every after 4 days.
We were advised to sleep in one bed for 2 days and then switch to another for the other 2 days. Some of the items we found include: TV set, small Fridge, Electric kettle, & Small Vault.

Meal time has always been the most trying moments we had at Narita right from the on set. Eating the same food over and again for 2 weeks. This even worsen when the number of residents increased in the last week. There was no option of online order, since we did not have a local SIM card.

From doing exercise, although we were blocked from routine exercise at tennis ground.

WhatsApp video call with Herbert Abigaba at the Ministry.

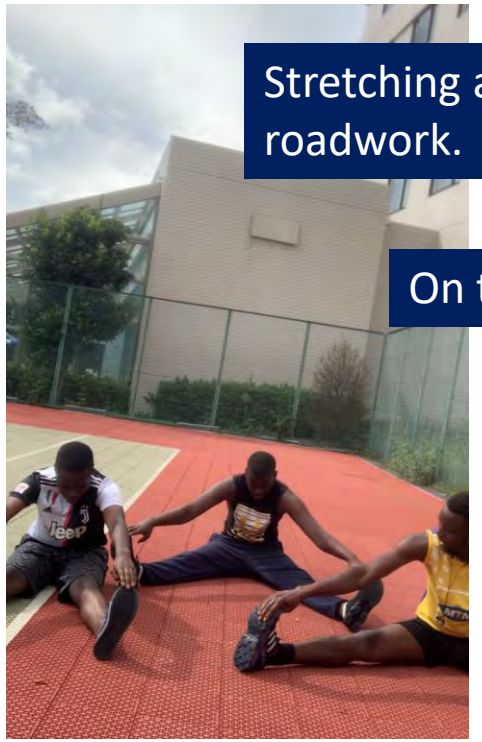
Ugandan porridge called BUSHERA, Edgar was preparing it.



OUTDOOR EXERCISE DURING QUARANTINE

We jogged around the court for 10kM.

Just Preparing to Start Roadwork exercise



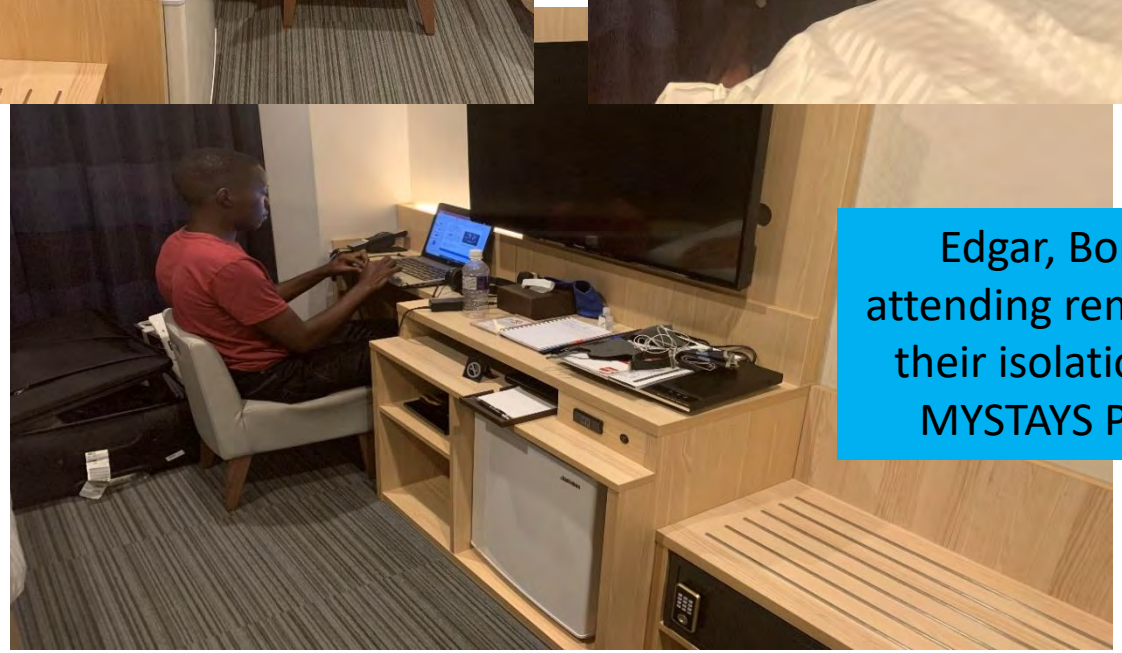
Stretching after the roadwork.

On the Tennis court

WORKING HARD AMIDST THE QUARANTINE

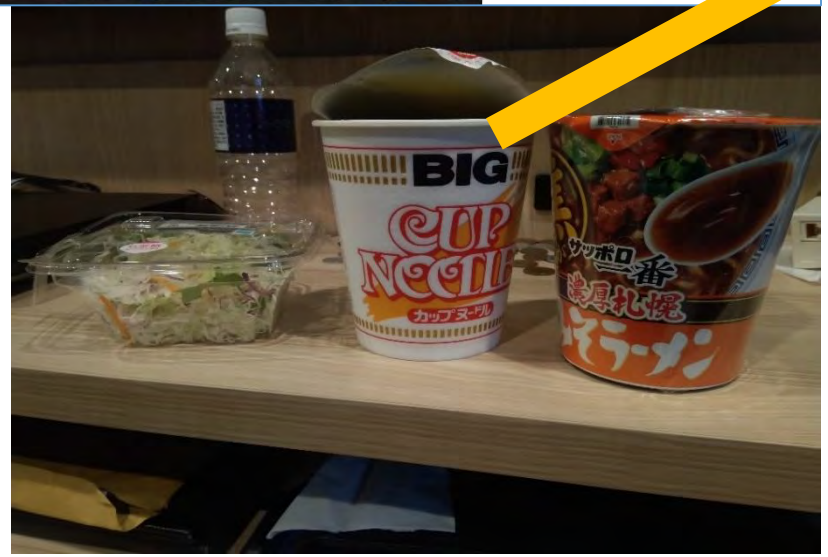
Ugandan students having a working session at the reading lounge of the Hotel

Bonny Contacting the Uganda Embassy in Japan (Tokyo) about our safe arrival in Narita.



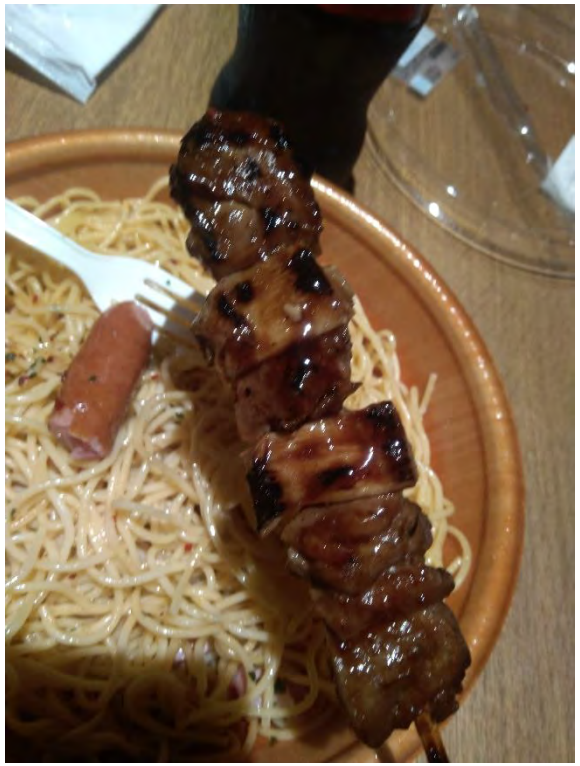
Edgar, Bonny & Derrick attending remote classes from their isolation rooms (Hotel MYSTAYS Premier Narita)

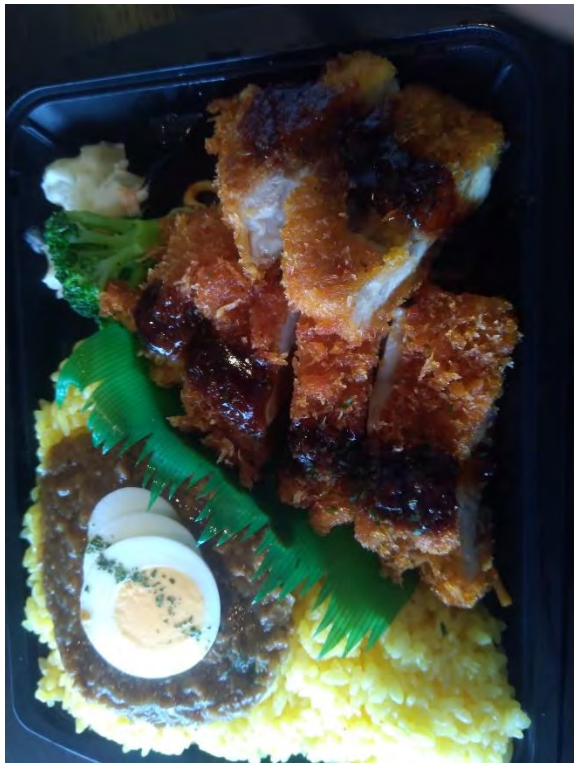
Above: **Daily ZOOM meeting with Prof. Maeda about our welfare.**



We had a taste of instant noodles after a tip from Prof. Maeda.

Our favorite foods from the Convenient store – Family Mart





We quickly fell in love with foods and we could not spend two days without going along with this meal.

食事冒険

Bonny cutting Edgar’s hair.

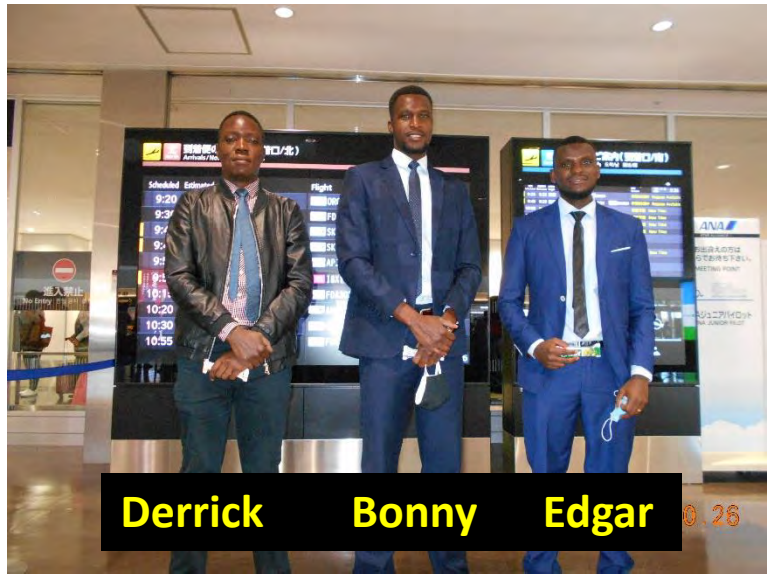
Final tour around Hotel Mystays Premier.

Excitement sets in including packing and hair cuts, and ironing clothes as displayed below.

Edgar cutting Derrick’s hair.

THE END

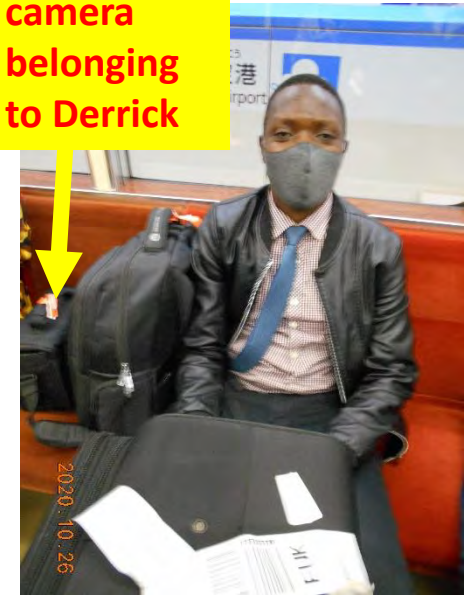
08. BIRDS-5: Uganda team transfers from Fukuoka Airport to Kyutech on 26 Oct 2020



They arrived on JetStar flight GK 503 from Narita to Fukuoka. Arrival was 9:25 AM at the domestic terminal.

Displaying the flag of Uganda inside the subway station

Expensive camera belonging to Derrick



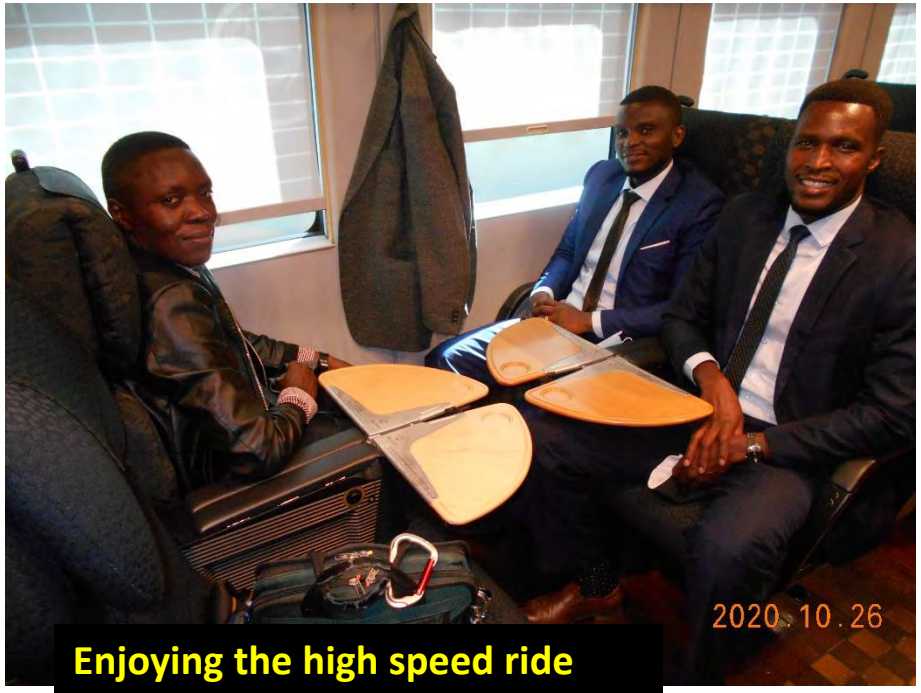
Above: Getting into the subway elevator.

← Derrick enjoying the ride to Hakata Station

Above: Outdoor escalator of Hakata Eki.
Below: At Daiso (big 100 yen shop of Hakata Eki).

Boarding the 特急 express train to Kurosaki at 11:00 AM

The travel path was this

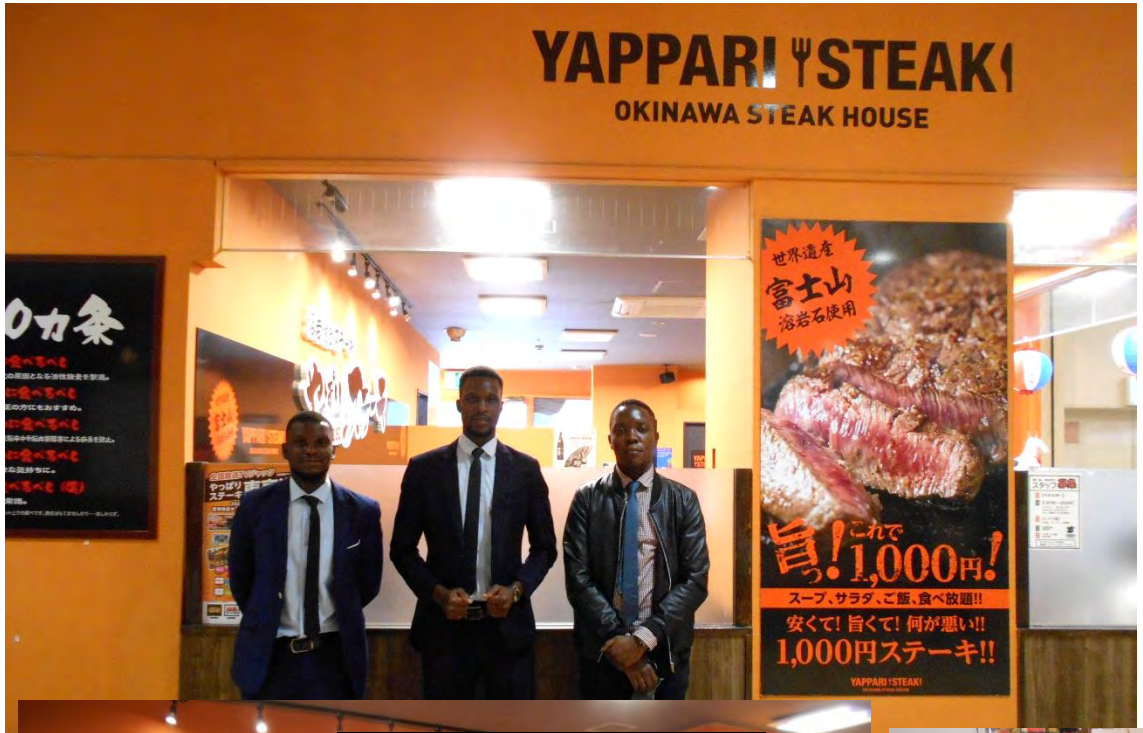


Enjoying the high speed ride from Hakata Eki to Kurosaki Eki

Below:

Tobata Station (noon)

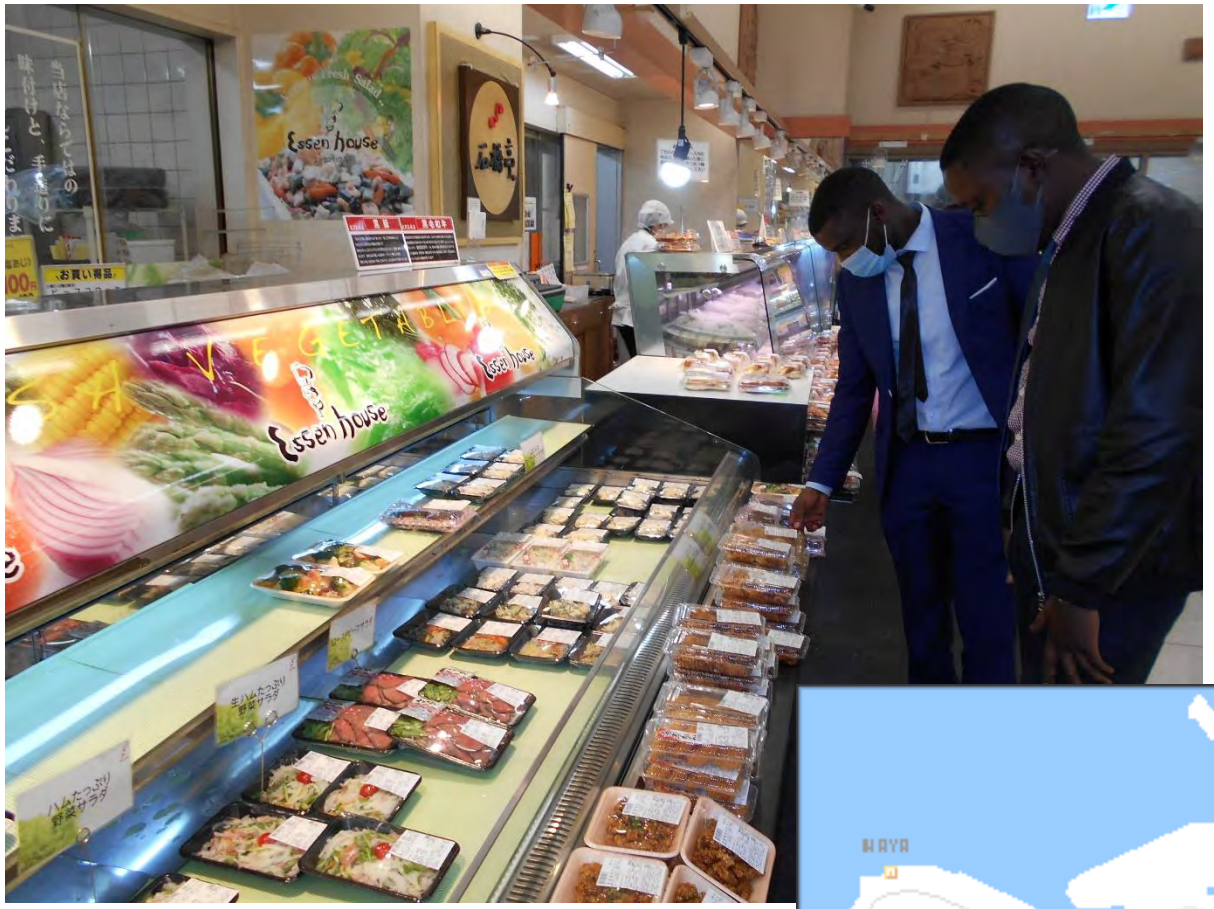
普通電車 from Kurosaki to Tobata



Heavy lunch at Tobata Station

← Ice cream was around the corner

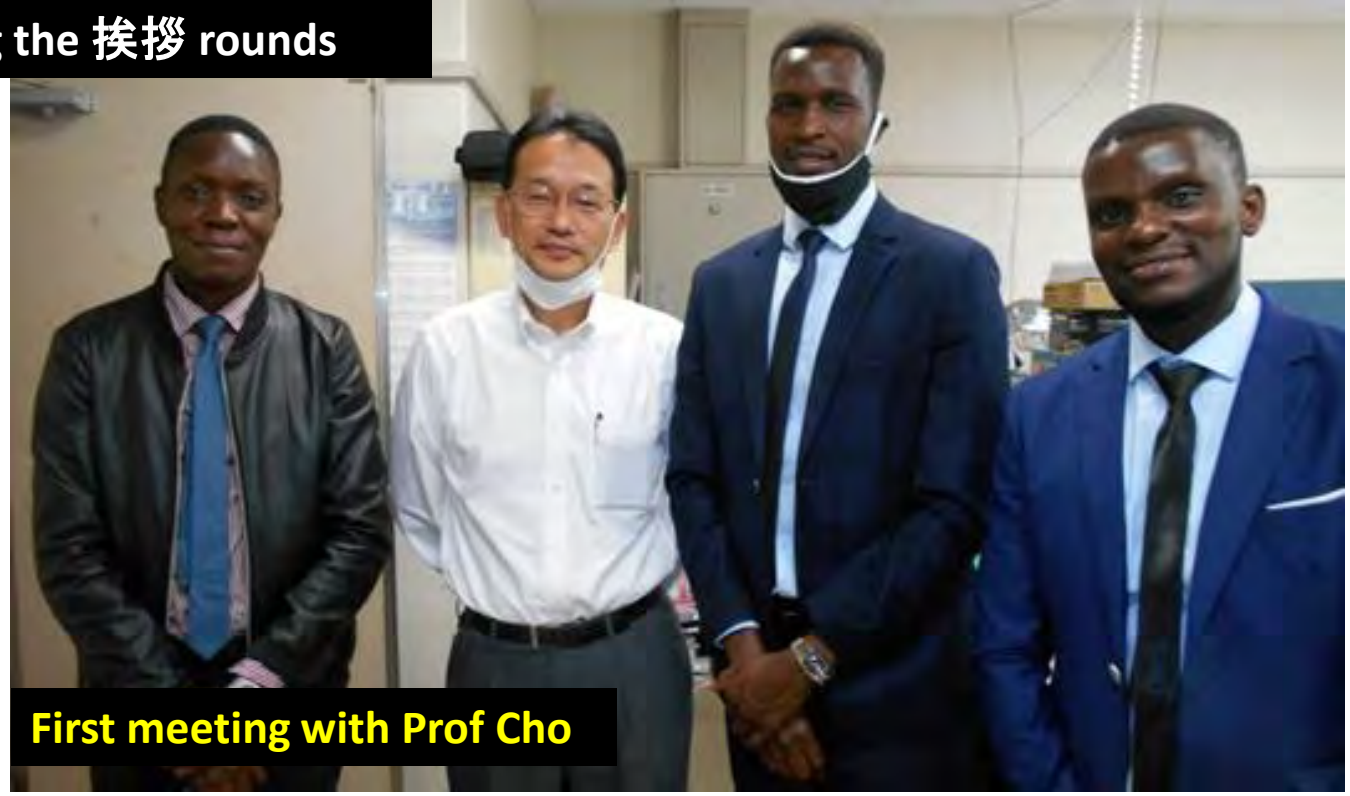
BR (31) ice cream in Japan:
https://favy-jp.com/topics/485



Checking out a Japanese supermarket (AEON @ Tobata Station)

Checking out a 100 yen shop (Seria @ Tobata Station)


Kyutech Main Gate
九工大の正門
2020.10.26


Making the 挨拶 rounds
First meeting with Prof Cho


Graduate School Office
2020.10.26


研究協力


First meeting with tutor

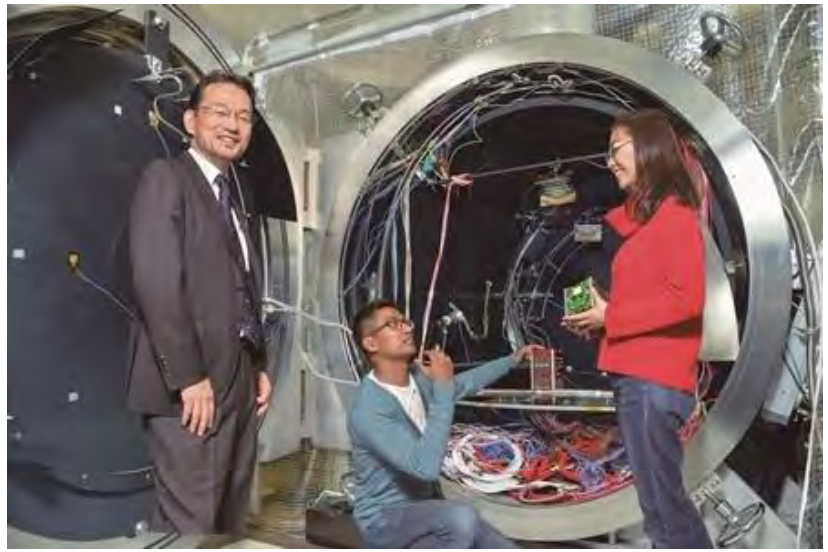
Visit to the clean room

Visit to the big thermal vacuum chamber

Above:
First meeting with other members of BIRDS-5
(all photos of this page were taken in the SBVL building)

Primary chef was Victor →

Welcome Picnic Lunch for the Ugandan team, on 31 October 2020.
Food was prepared by the team of Zimbabwe.



Check out the details here (in Japanese):
https://www.kyutech.ac.jp/student-cheer/k03.html

宇宙システム工学科

いざ、大いなる宇宙のフロンティアへ

宇宙システム工学科では、宇宙システムに限らず、さまざまな分野における複雑な工学システムの創生、研究開発、製造、運用を担える高度技術者・研究者の養成を目指しています。
学生は、「機械宇宙システム工学コース」と「電気宇宙システム工学コース」に分かれて機械または電気の専門科目を学びます。更に、宇宙工学に関する専門科目を学ぶと同時に、システムエンジニアリングやプロジェクトマネジメントを講義やPBLを通じて学びます。
学生は、宇宙システムを題材として、複雑なシステムをどのように作り、プロジェクトをどのように実施するかを学びつつ、システム及びプロジェクト全体を俯瞰できる資質を身につけます。宇宙システム工学科は、次世代の宇宙開発・利用を担いたいと思うキミたちに、ホンモノの宇宙を学ぶ場を提供します。

10. UN/Japan collaboration: "KiboCUBE“ --- the first five rounds

UNITED NATIONS
Office for Outer Space Affairs

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

Our Work > Programme on Space Applications > Human Space Technology Initiative (HSTI) > Orbital Opportunities > KiboCUBE

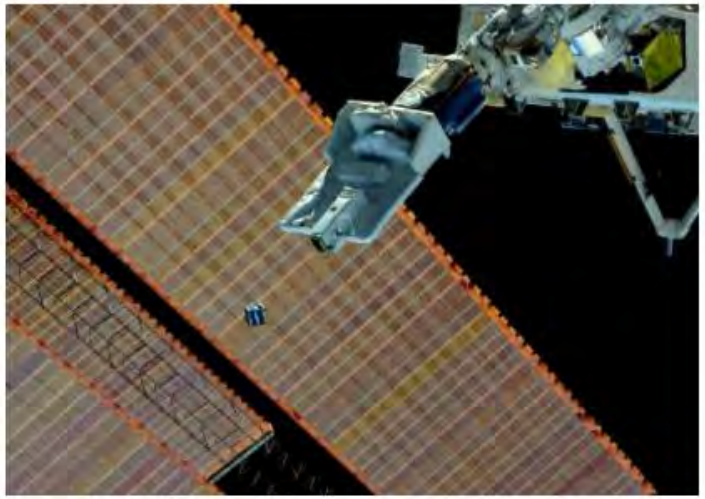
The United Nations/Japan Cooperation Programme on CubeSat Deployment from the International Space Station (ISS) Japanese Experiment Module (Kibo) "KiboCUBE"

Read stories from the winning teams from Kenya and Guatemala: Testimonies

The United Nations Office for Outer Space Affairs (UNOOSA) and the Japan Aerospace Exploration Agency (JAXA) are pleased to announce the *United Nations/Japan Cooperation Programme on CubeSat Deployment from the International Space Station (ISS) Japanese Experiment Module (Kibo) "KiboCUBE"*.

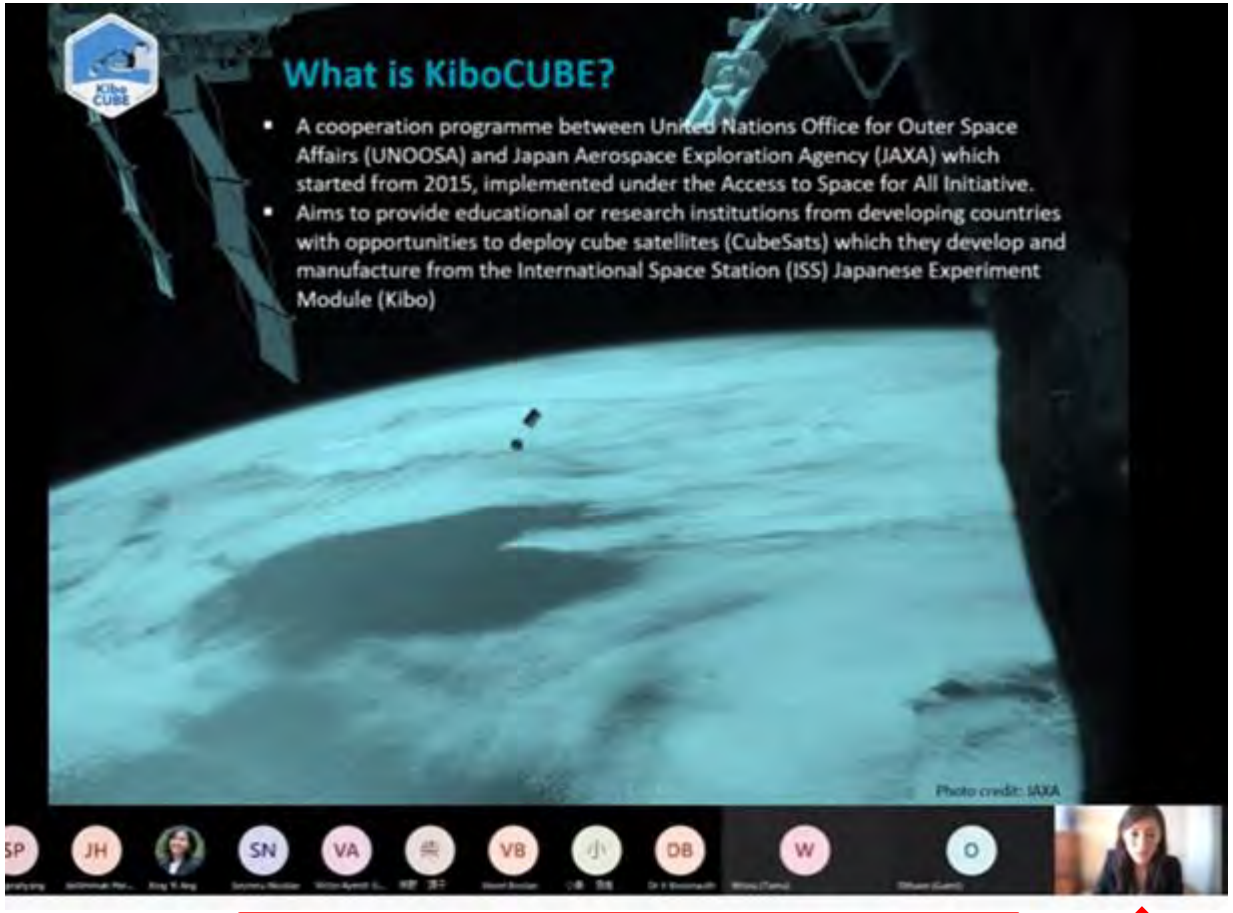
KiboCUBE is the dedicated collaboration between UNOOSA and JAXA in utilizing the ISS Kibo for the world. KiboCUBE aims to provide educational or research institutions from developing countries of United Nations membership with opportunities to deploy, from the ISS Kibo, cube satellites (CubeSats) which they develop and manufacture.

See this entire page at:
https://www.unoosa.org/oosa/en/ourwork/psa/hsti/kibocube.html

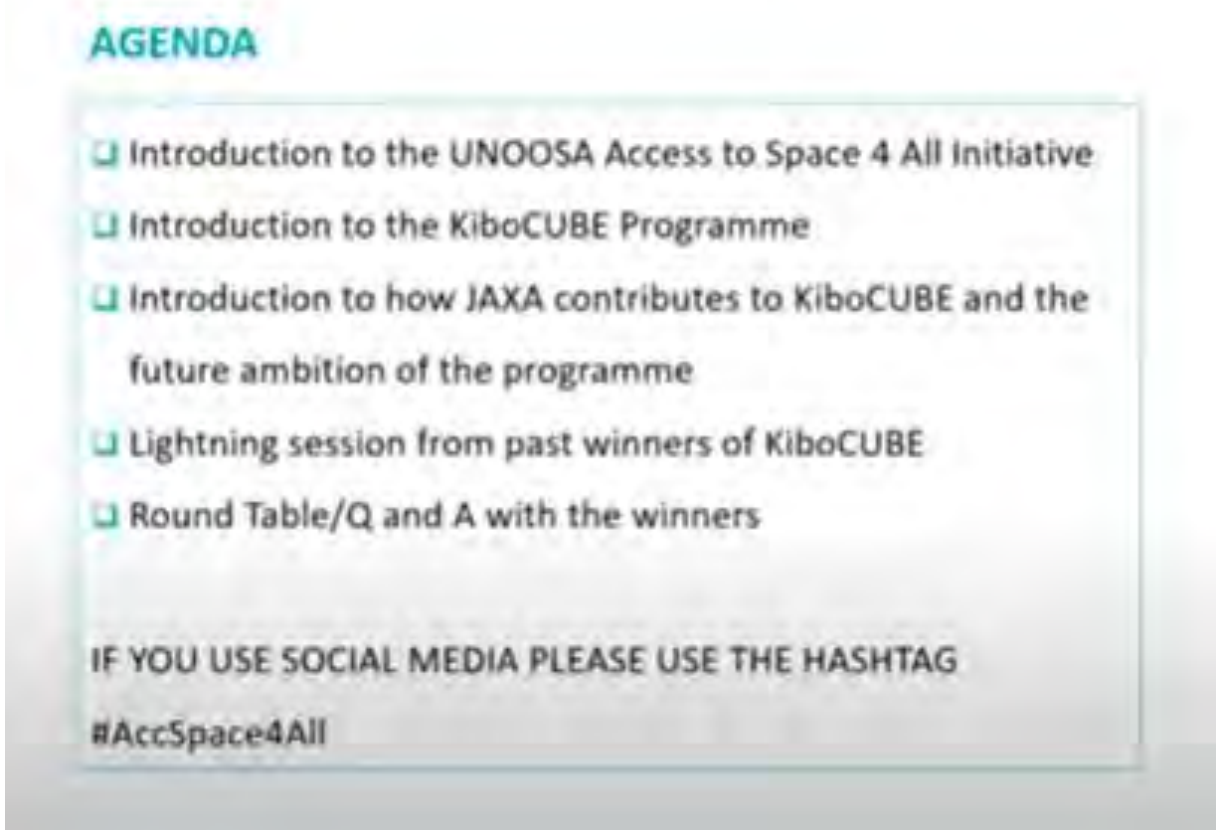


Deployment of a CubeSat from the ISS. Photo: NASA/JAXA

ISS022E063058



Ms. Hazuki Mori, UNOOSA staff member



WEBINAR that occurred on 9 Oct 2020: World Space Week

"Enabling more countries to access space through the KiboCUBE opportunity"

Agenda / Presentations: UNOOSA , JAXA, Guatemala, Mauritius, Indonesia, Moldova, SICA

VIEW THE WEBINAR (1.5 hours): https://www.youtube.com/watch?v=buIHW52kb_Y

← The Universidad del Valle de Guatemala

Announced during the Webinar:

Congratulations to *SICA* of Central America

Kibo CUBE

UNITED NATIONS
Office for Outer Space Affairs

Previous Winners

	Winner	Objective	Deployed	Launched	Selected
1st round	KENYA: University of Nairobi "1KUNS-PF"	To monitor agriculture and coastal areas	11.05.2018	04.2018	08.2016
2nd round	GUATEMALA: Universidad de Valle De Guatemala "Quetzal-1"	To acquire remote sensing data for natural resource management	29.4.2020	03.2020	09.2017
3rd round	MAURITIUS: Mauritius Research Council "MIR-SAT 1"	To collect thermal infrared images and to test onboard communication	Currently under development		06.2018
3rd round	INDONESIA: Surya University "SS-1"	To demonstrate remote communication	Currently under development		09.2018
4th round	MOLDOVA: Technical University of Moldova "TUMnanoSAT"	To demonstrate technology and test various components	Currently under development		06.2019
5th round	SISTEMA DE LA INTEGRACIÓN CENTROAMERICANA "MORAZAN-SAT"	To monitor weather variables in remote areas providing early warning during extreme weather events	Currently under development		2020

11. Issued by JAXA: Certificate of acceptance for Paraguay's first satellite

My hearty congratulations to AEP (space agency of Paraguay) and the entire BIRDS-4 Team (based at Kyutech). This was a job well done.

- G. Maeda, Editor.

12. The IAF launches the world's largest digital library on space

The text at the right was received from the IAF as email on 12 Nov 2020. *Editor*

The IAF Launches World's Largest Digital Library on Space!

The *International Astronautical Federation* (IAF) is incredibly proud to announce the release of the IAF Digital Library - the world's premier digital library on space, featuring over 50,000 full-text articles from all space disciplines. The IAF's digital heritage covers more than 70 years of knowledge sharing and research collaboration, and aspires to strengthen the links between industry, research and academia, and those who work in the front line in the field.

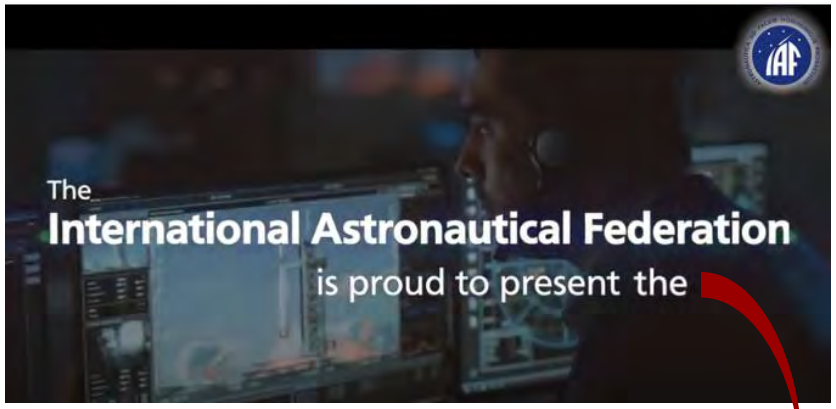
The IAF Digital Library is the largest source of papers worldwide, accessible to everyone who is passionate about space including researchers, scientists, engineers, academicians, industrials, policy-makers, media, the young generation and the general public.

This new IAF initiative aims to be a destination where knowledge goes beyond the space and digital divide, extending the boundaries of the past, envisioning the future and establishing itself as an infinite source of information, innovation, and inspiration for the benefit of humanity.

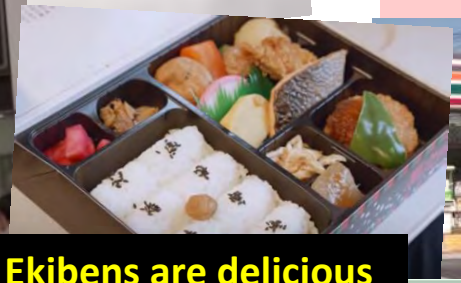
Visit the IAF Digital Library: http://dl.iafastro.directory/

Continued on the next page

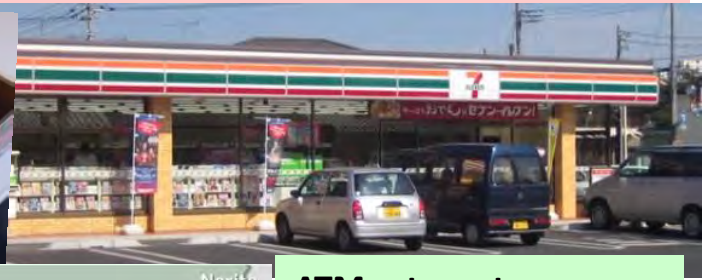
IAF Digital Library (2-min. video): https://www.youtube.com/watch?v=e0KWPOmop90



13. Visiting Japan for the first time? I highly recommend this 10-min. video



Ekibens are delicious



ATMs at most conve-nience stores (above) accept your VISA card

Do you know someone who will soon arrive at Narita for a short or long adventure in Japan? This video offers 15 tips that I consider all useful points to consider. Japan is super convenient but only if you know the tricks of the trade.

This point is especially noteworthy: *Get a lot of business done at the airport.* It is true! Outside the airport, money change and other tasks get harder to do.

"15 Tips for First-Time Travellers to Japan" [10 minutes] 27 March 2019

https://www.youtube.com/watch?v=00ZXaXIABMY&t=80s

14. Press release by Satellogic regarding recent successes

View this email in your browser (https://mailchi.mp/ace3dfcbde8a/sophie-marie-launch-update-4094269?e=59f3eff511)

POST-LAUNCH REPORT / 13 NOV 2020

Satellogic becomes the global leader in high-resolution data collection from Space

On November 6 at 3:19 UTC, we successfully launched 10 NewSat satellites to our Aleph-1 constellation. This was our largest launch to date, and it marks a major milestone for the company and our customers.

With these 10 new spacecraft, Satellogic has more in-orbit capacity for high-resolution imagery than any other company in the Earth Observation (EO) market. We're proud that this launch has cemented our position as the number one provider for high-resolution, high frequency EO imagery. Once positioned and fully calibrated, our in-orbit constellation will offer our customers 0.7 meter resolution imagery, providing a more detailed view of the globe for more precise decision making. Additionally, our expanded capacity will deliver increased revisit capabilities, with up to four daily revisits of any point of interest, as well as complete remapping of any country every month and the collection of over 4 million sq. kilometers of high-resolution data every day.

Since our founding, we have been driven by the vision of democratizing access to high-resolution, high frequency EO imagery. It's what has pushed us to design and manufacture highly efficient satellites. We then pass those efficiencies along to our customers, giving them unit economics that are better by several orders of magnitude. We know that high-resolution, high frequency imagery can only be applied to industry if it is offered at commercially viable prices.

With our most recent launch, Satellogic now owns the largest orbital capacity of high-resolution, high frequency commercial data in the industry. This ensures that we can meet the rising global demand for geospatial analytics and imagery, especially among customers who have previously been priced out of this market.

By driving down costs we are not only expanding access to our Dedicated Satellite Constellation service, but also unlocking use cases in agriculture, energy, forestry, insurance, and financial services. Previously, these industries have had to rely on less efficient technologies — from drones and helicopters to planes and sheer boots-on-the-ground manpower. Now they can leverage the trusted intelligence of geospatial analytics and imagery.

ABOVE:
Spanish: *ÑuSat*, sometimes translated into English as *NewSat*

Details about NewSat are here:
https://en.wikipedia.org/wiki/%C3%91uSat

Post-Launch Report

Within the first two hours following deployment, we successfully contacted all ten satellites. Our team's collaborative efforts ensured that the satellites were tracking against their expected launch protocols and communicating as planned.

Thanks to thorough planning and coordination between the launch vehicle and ground stations, we were able to maintain contact and consistently monitor the new fleet during the critical 48 hours that followed the launch. After performing routine health and diagnostic tests, as well as confirming communication capabilities, we began the commissioning of the platform, satellites buses, and payloads.

Over the next few weeks, our commissioning team will continue to ensure that all systems are operating as expected. They will also adjust the satellites' relative positions to evenly distribute our constellation, which will maximize our revisit capabilities and exponentially increase our in-orbit capacity.

Launch Events

During launch, we saw each stage completed successfully and on schedule as follows:
First passes over Troll ground station in Antarctica and Svalbard north pole ground station: first telemetry packets received. The new fleet is part of the Aleph-1 constellation and welcomed to our space family! Early verification of satellites' good health through beacons. Tests and verifications completed to understand satellite health. Early orbits store telemetry download, analysis, and maneuvers for satellite stabilization and verification processes performed by Operations and Commissioning team.

Introducing our new satellites

Named after exceptional scientists, these new satellites continue our tradition started in 2018 of honoring outstanding women in STEM of all times. These accomplished women inspire us and reinforce our commitment to diversity, equity and inclusion.

① **ALICE Ball** (1892-1916) was an American chemist who developed the "Ball Method", the most effective treatment for leprosy during the early 20th century. She was the first woman to receive a master's degree from the University of Hawaii, and was also the university's first female chemistry professor.

② **CAROLINE Herschel** (1750-1848) was a German astronomer who was a pioneer in the field and is considered the first professional female astronomer. Her most significant contributions to astronomy were the discoveries of several comets. She was the first woman to receive a salary as a scientist.

③ **CORA Ratto** (1912-1981) was an Argentine mathematician, educator and militant activist in support of human and women's rights. In 1941, following the Nazi invasion of the Soviet Union, she established and headed the anti-fascist Junta de la Victoria which stood for democracy and women's suffrage.

④ **DOROTHY Vaughan** (1910-2008) was an American mathematician and human computer who worked for the NASA, at Langley Research Center in Hampton, VA. In 1949, she became acting supervisor of the West Area Computers, the first woman of African descent to supervise a group of staff at the center.

⑤ **EMMY Noether** (1882-1935) was a German mathematician who made many important contributions to abstract algebra. Described as the most important woman in the history of mathematics, she has also a famous theorem in mathematical physics known as Noether's theorem.

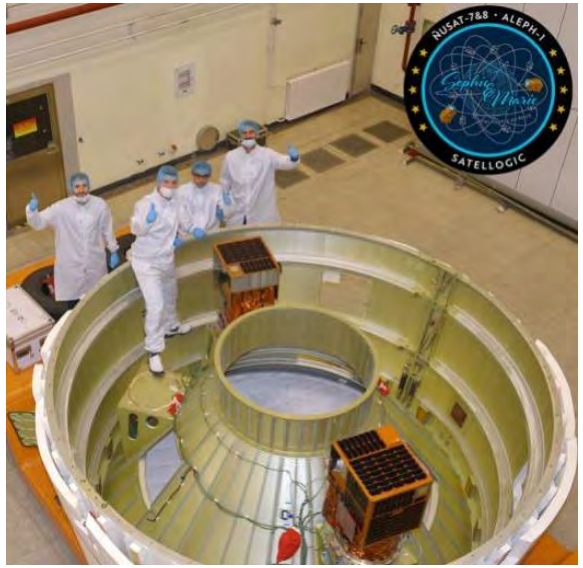
⑥ **HEDY Lamarr** (1914-2000) was an Austrian-American actress and inventor who became a pioneer in the field of wireless communications. The technology that she helped to invent would form the technical backbone that makes cellular phones, fax machines and other wireless operations possible.

⑦ **KATHERINE Johnson** (1918-2020) was an American mathematician whose calculations of orbital mechanics as a NASA employee were critical to the success of the U.S. crewed spaceflights, and essential to the beginning of the Space Shuttle program. She worked on plans for a mission to Mars.

⑧ **LISE Meitner** (1878-1968) was an Austrian-Swedish physicist who contributed to the discoveries of the element protactinium and nuclear fission. Praised by Albert Einstein as the "German Marie Curie", she was the first female from the University of Vienna and 2nd in the world to earn a doctorate in physics.

⑨ **MARY Jackson** (1921-2005) was an American mathematician and the first female engineer of African descent at NASA where she earned the most senior engineering title available and became manager of the Federal Women's Program in the NASA Office of Equal Opportunity Programs.

⑩ **VERA Rubin** (1928-2016) was an American astronomer who pioneered work on galaxy rotation rates. Her data provided some of the first evidence for dark matter. She spent her life advocating for women in science and was known for her mentorship of aspiring female astronomers.



Space-X test

Satellogic

From *Wikipedia*, the free encyclopedia https://en.wikipedia.org/wiki/Satellogic

Company Website: www.satellogic.com

Satellogic is an Argentine company specialized in Earth-observation satellites, founded in 2010 by Emiliano Kargieman and Gerardo Richarte. Satellogic made Argentina's first two nanosatelites, CubeBug-1 (nickname El Capitán Beto, COSPAR 2013-018D, launched 26 April 2013 on a Long March 2D launch vehicle) and CubeBug-2 (nickname Manolito, also known as LUSAT-OSCAR 74 or LO 74, COSPAR 2013-066AA, launched 21 November 2013 on a Dnepr launch vehicle). Their third satellite, BugSat 1 (nickname Tita), launched in June 2014. Both the CubeBug-1 and CubeBug-2 as well as the BugSat 1 satellite served as technology tests and demonstrations for the ÑuSat satellites. They also had amateur radio payloads.

The CubeBug project was sponsored by Argentinian Ministry of Science, Technology and Productive Innovation.

Satellogic began launching their Aleph-1 constellation of ÑuSat satellites in May 2016.

On 19 December 2019, Satellogic announced they have received US$50 million in funding in the latest funding round.

Design and Implementation of Low Cost Transceiver for CubeSat Communication

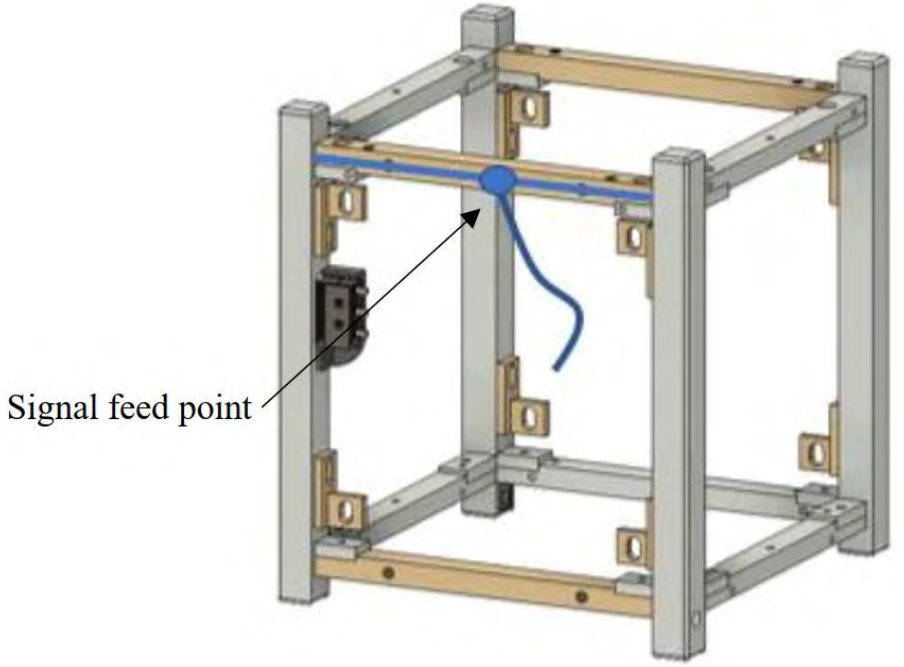
by: Tharindu (Sri Lanka)
member of BIRDS-3 and KITSUNE projects

14 November 2020

Why this design ?

The initial reason for designing the this transceiver was Hentenna mission of BIRDS-4 CubeSat.

<u>BIRDS-4 Hentenna mission</u>
Mission statement of the Hentenna mission is,
Utilizing 1U CubeSat main frame as an antenna.



In the mission operation, antenna implemented using satellite frame (Hentena) will transmit a CW beacon signal (437.375 MHz beacon). And BIRDS ground station will measure how much power receiving from the beacon transmitted using Hentenna. By using measured CW power levels, Hentenna performance will be determined.

Even though this transceiver is initially designed for BIRDS-4 Hentenna mission it can be can be used as the main transceiver of a CubeSat. The main highlighted property of this transceiver is its cost. This transceiver manufacturing cost is much cheaper than currently used BIRDS transceiver.

Transceiver specifications

- Frequencies of operation 430-440 MHz (can be programed, resolution 61Hz)

- Maximum output power - 30dBm (1Watt for LoRa, FSK, OOK)
  - 20dBm (100mW for CW beacon)

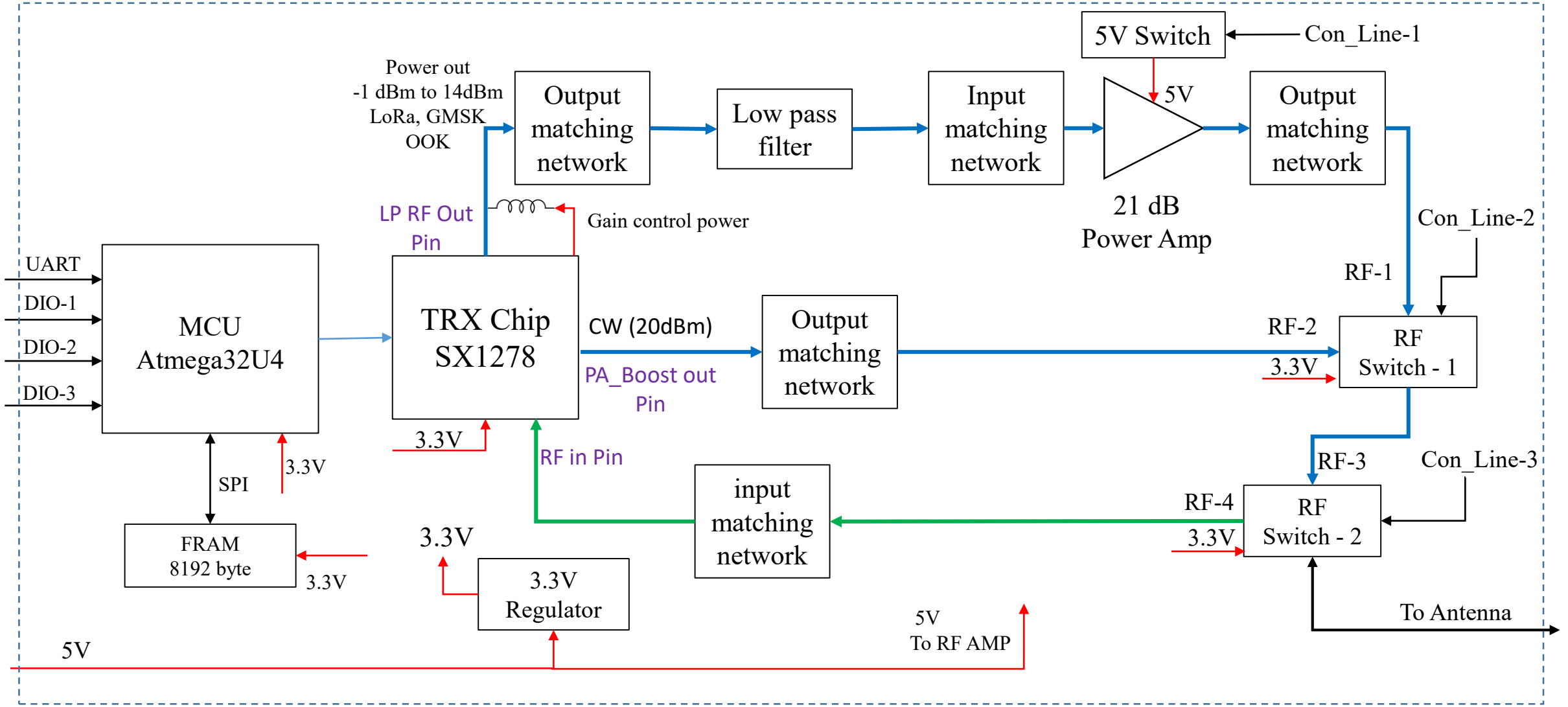
- Available Modulation Techniques - LoRa, FSK (0.3,0.5,0.8), OOK, CW

- Data rate - LoRa : 18bps – 37500bps
  FSK : 600bps – 768000 bps
  CW beacon : 20 wpm

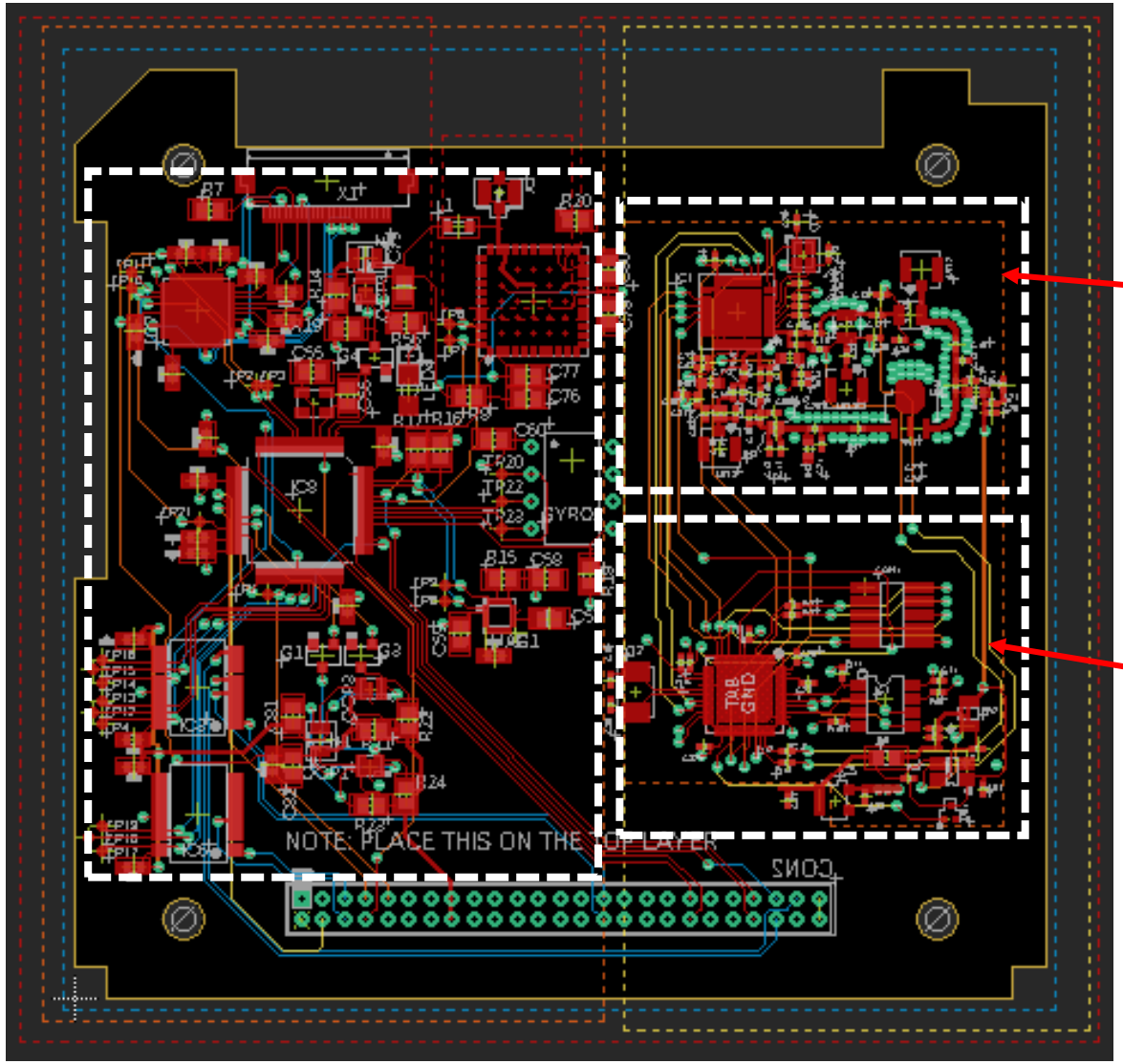
- Current consumption in CW mode : less than 100mA

- Bus system : BIRDS-3 bus system (Transceiver should be in Mission Board-1)

Transceiver Block Diagram (RF section)

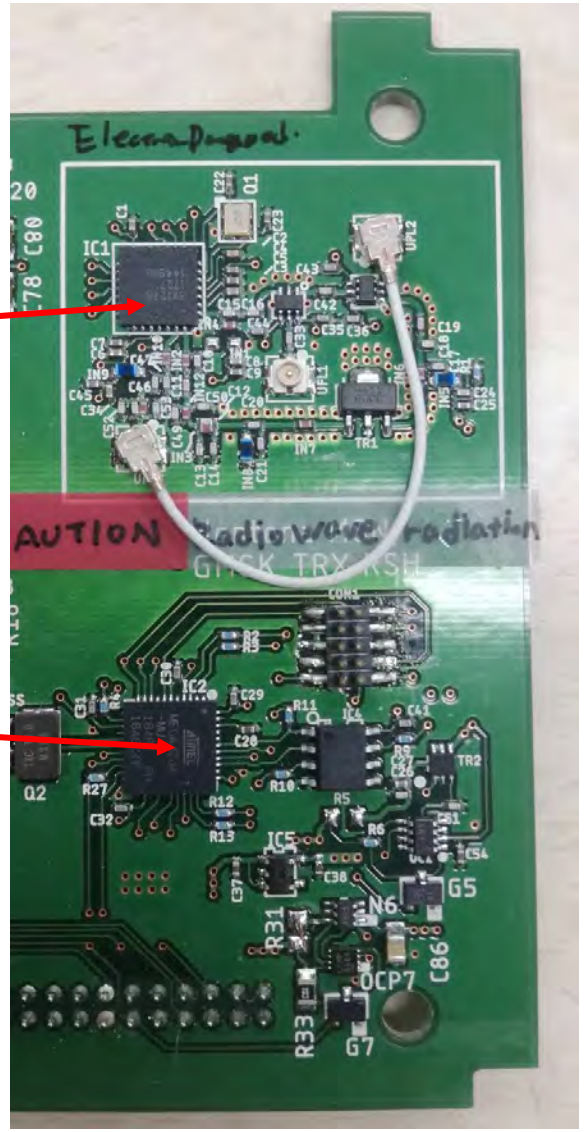


PCB Layout and Manufactured PCB



RF section of the radio

Digital Section of The radio



Transceiver Performance

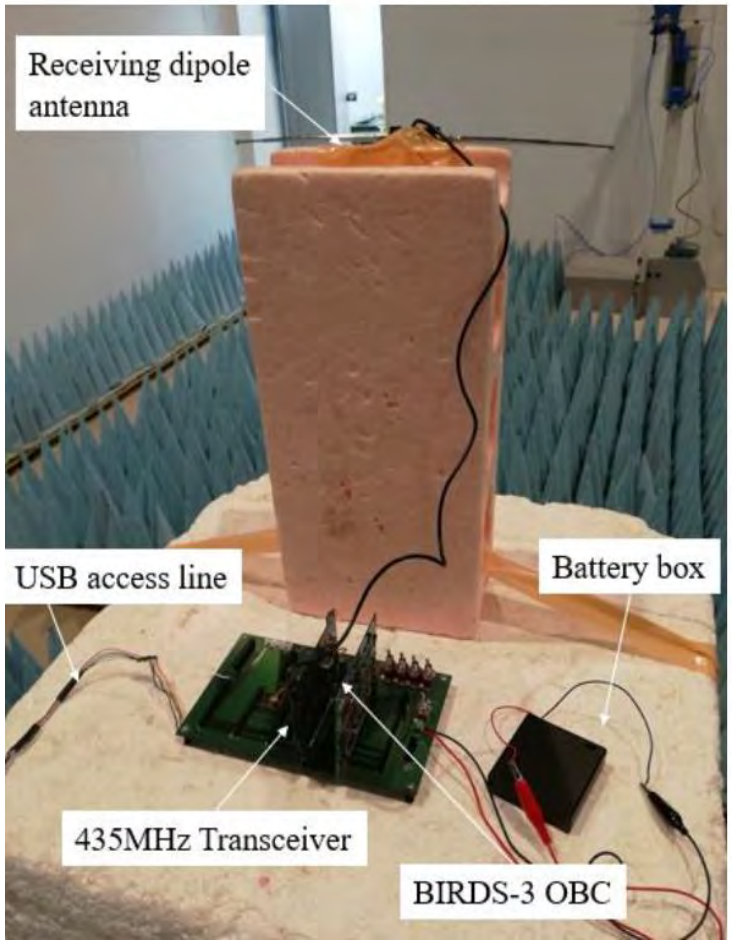
Power consumption

Mode	Current consumption	Power consumption	Efficiency (Ptx/Ptotal)	Efficiency of Current BIRDS radio
Receiving mode (FSK/LoRa)	39 mA	0.195 W	NA	NA
Transmition mode (FSK/LoRa, Ptx = 1 W)	605 mA	3.025 W	33 %	17.5%
Transmition mode (CW, Ptx = 63 mW)	65 mA	0.315 W	19.3 %	29 %

RF power amplifier gain = 19.2 dB

LoRa, FSK, OOK Output power = 29 dBm

CW beacon output power = 19 dBm



Receiving Sensitivity test in anechoic chamber

End of this report by Tharindu

16. BIRDS-4: Delivery of satellites to JAXA by BIRDS-4 students

BIRDS-4 Delivery to JAXA

Over a week after the handover ceremony, the BIRDS-4 satellites were scheduled to be delivered to JAXA at Tsukuba, Ibaraki. Delivery preparations include charging the satellite batteries and carefully wrapping with bubble wrap before putting inside the pelican case.

Satellites being prepared the day before the travel to Tsukuba, Ibaraki

Original article: Pages 36-39, *Issue No. 57*, BIRDS Project Newsletter

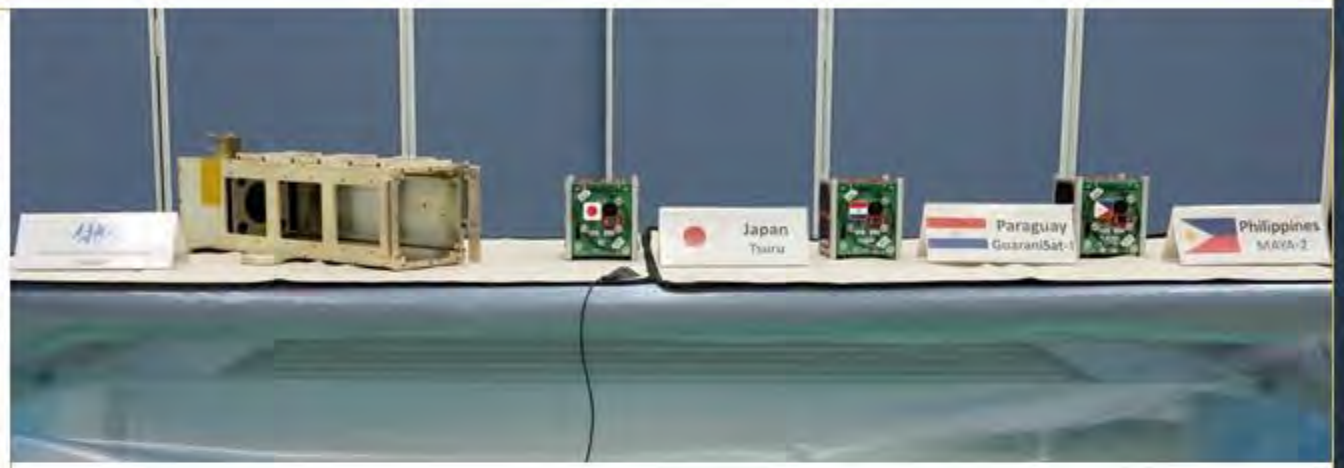
BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

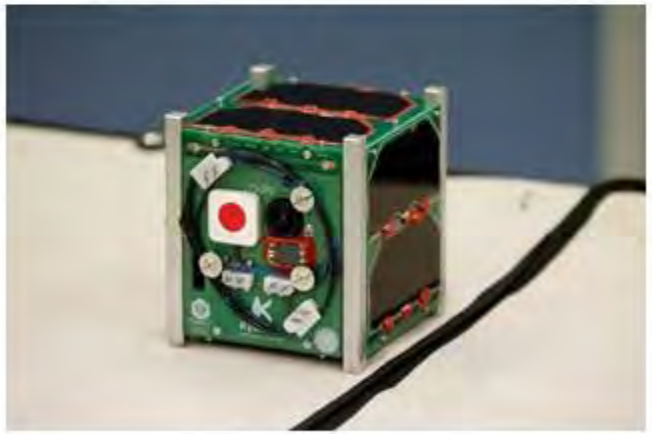
This article is a continuation of an article in the previous issue of this newsletter.

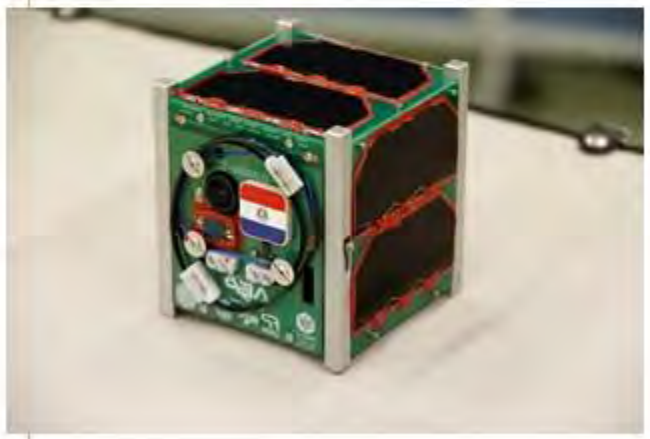
BIRDS-4 Delivery to JAXA

Last October, BIRDS-4's satellites were delivered to JAXA at Tsukuba, Ibaraki. During the inspection and hand-over, JAXA took several pictures. All the photos are taken and copyright by JAXA.

The photos show the satellite after being inspected and fit checked in the pod.







BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by:

Izrael Bautista
Photos: copyright by JAXA

BIRDS-4 Delivery to JAXA

After passing the inspection and fit check test, Certificates of acceptance were signed and handed to us by the manager of utilization of KIBO Expose facility

We were able to meet Hisatsugu who is now working in Ibaraki. We had dinner at a Yakiniku restaurant and ate some delicious Japanese meal

Each of us took a photo with the certificates of acceptance signed by the manager of the Utilization of KIBO expose facility

BIRDS-4
Joint Global Multi-Nation Birds Satellite Project

Article by:

Izrael Bautista
Photos: copyright by JAXA

BIRDS-4 Delivery to JAXA

BIRDS-4 members with the BIRDS-4 satellites and the Certificate of acceptance (L-R: Yuma Nozaki, Marloun Sejera, Izrael Bautista)

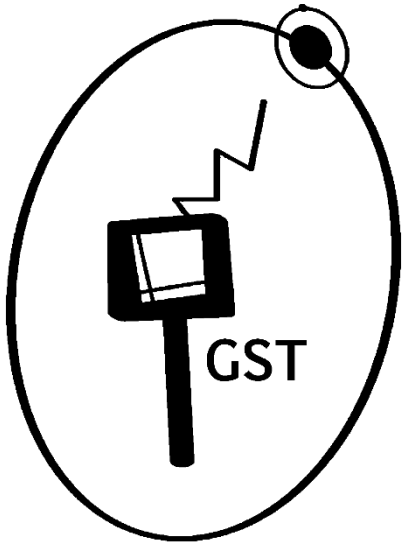
BIRDS-4 members with JAXA officials after the hand over of the BIRDS-4 satellites

END

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by:

Izrael Bautista
Photos: copyright by JAXA



Nik Amirul

GST Column

Second column (updates from Malaysia)

Compiled by: Pooja Lepcha, 15 Nov 2020

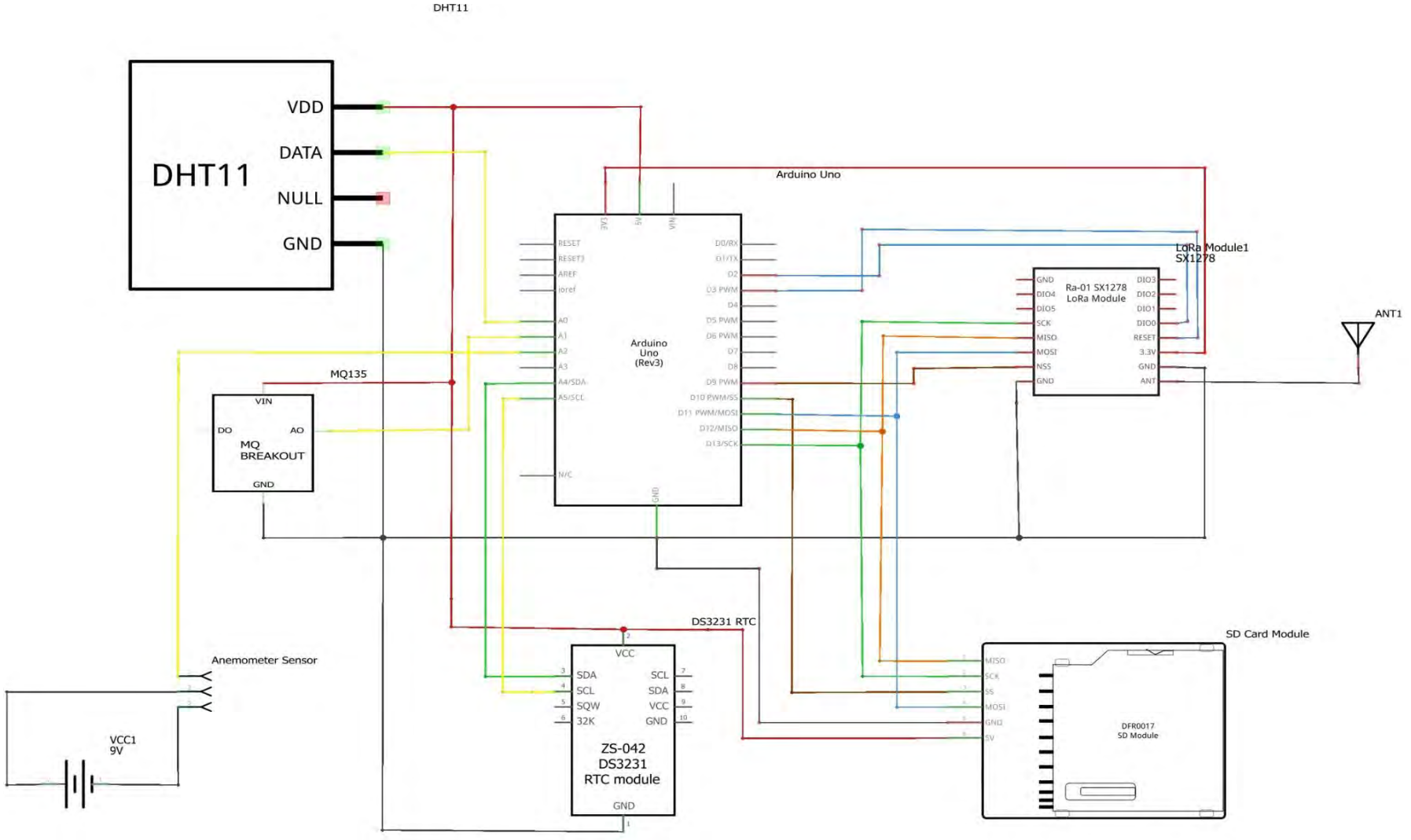
All updates provided by **Nik Amirul** from UiTM, Malaysia

Step 1: Components Selection

Component	Price (RM)
Arduino Uno	21.00
Anemometer Sensor	119.00
DHT 11 (Temperature & Humidity Sensor)	6.30
MQ135 (Air Quality Sensor)	15.00
DS3231 (RTC Module)	5.30
SD card module	5.60
LoRA module	51.11
	Total = 223.31RM ~ 54 USD

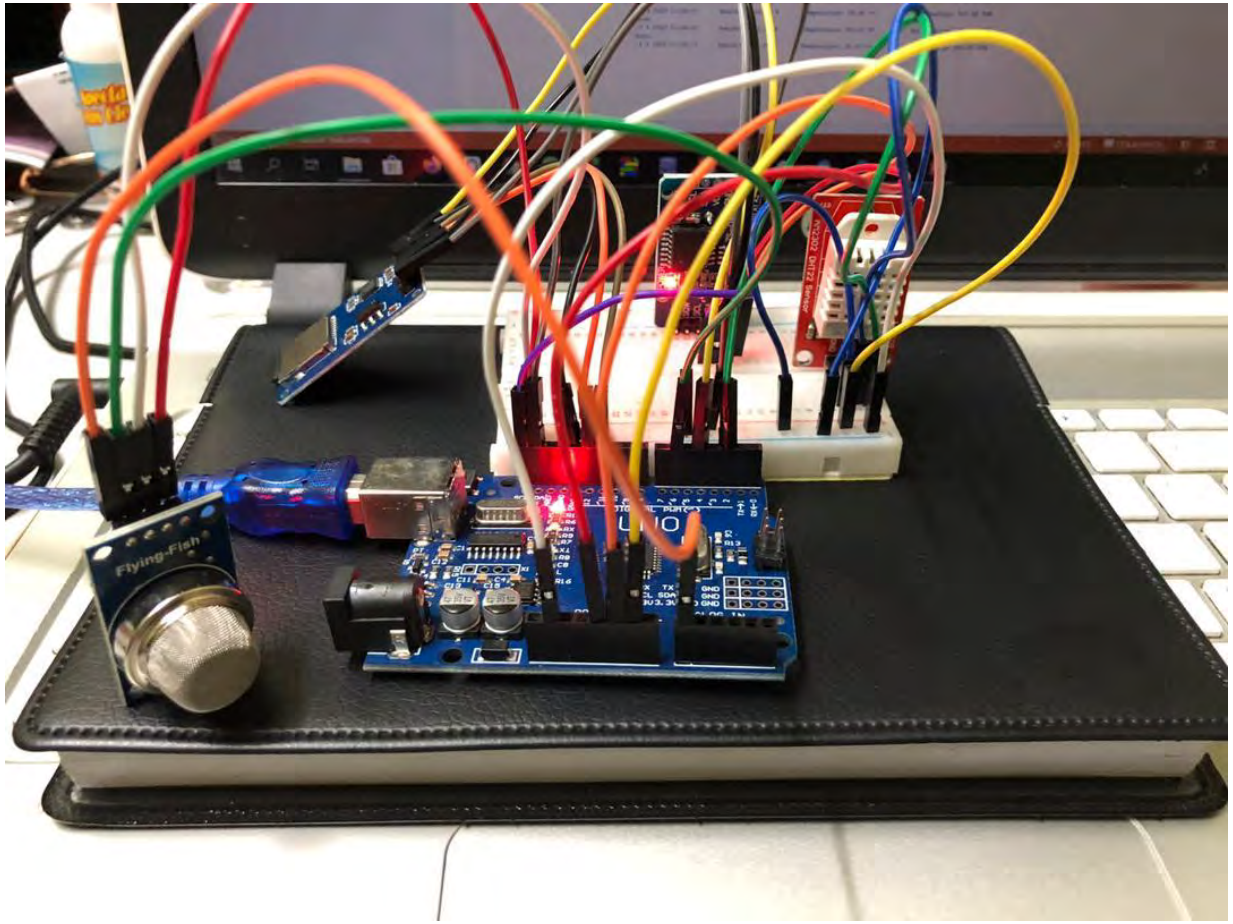
Components were selected based on the parameter Malaysia wanted to measure. They wanted to measure air quality, temperature and humidity.

Step 2: Schematic Design



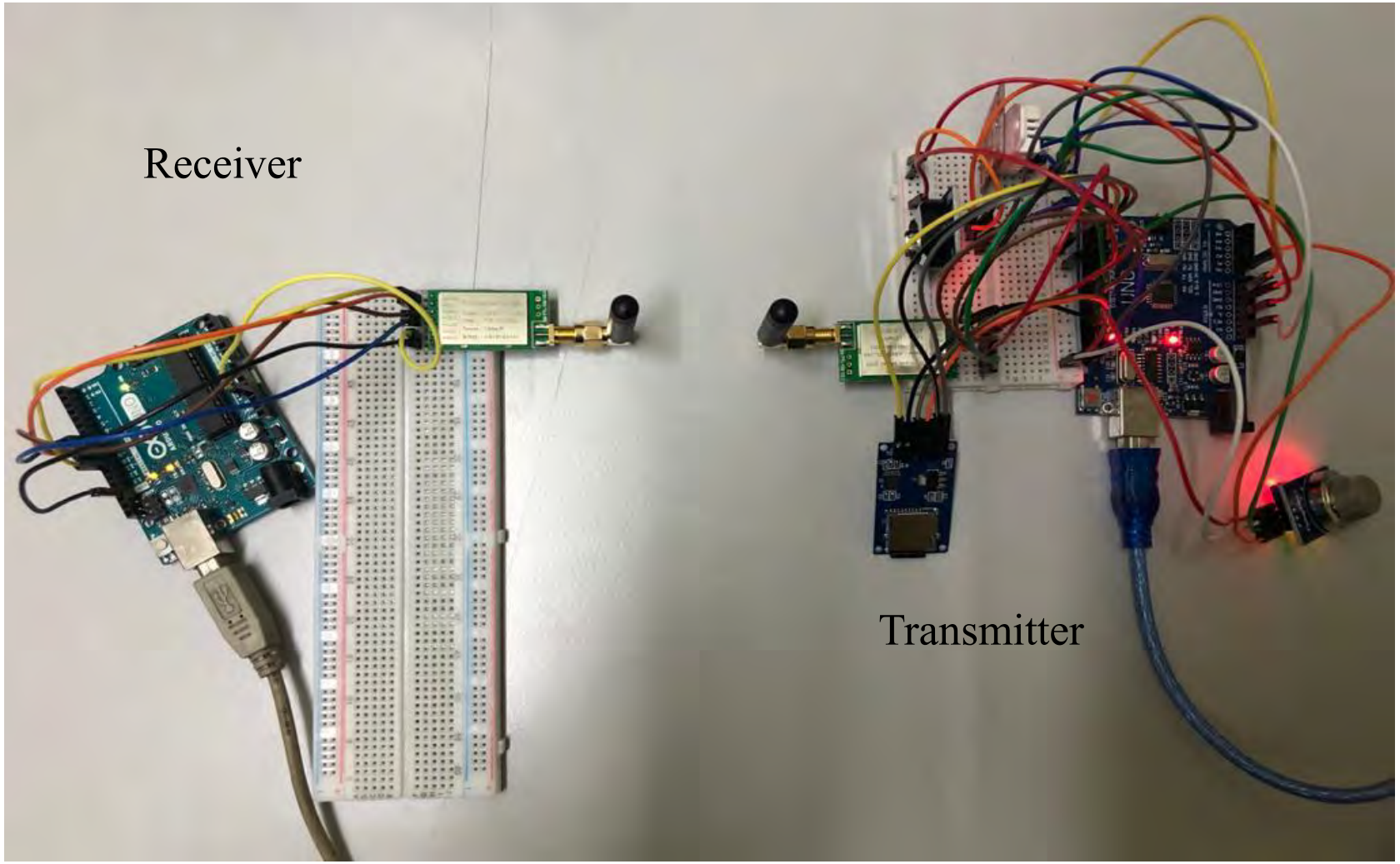
After components were selected, a schematic design was made to interconnect MCU with the sensors.

Step 3: Bread Board Model



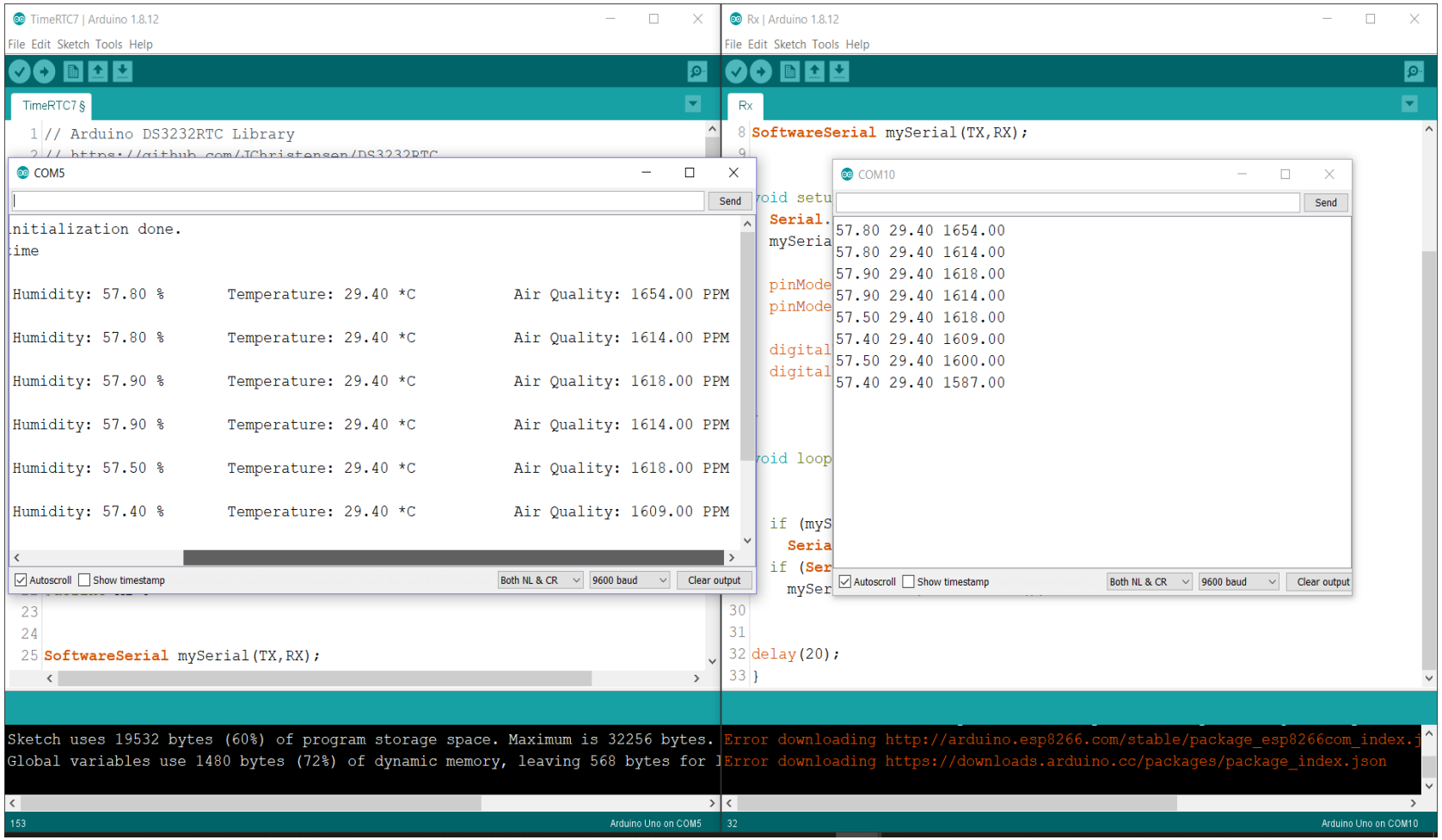
The schematic design was then implemented in a breadboard model and pins were connected using jumper

Step 4: Communication test



The breadboard model previously made becomes the transmitter. It sends data packets to another receiver. The communication test setup is shown in the picture. The receiver acts as a satellite in the real scenario.

Step 4: BBM Communication test



The data recorded by the transmitter is sent to the receiver wirelessly. The data received by the receiver is displayed. It corresponds to the data sent by the receiver.

Step 5: Antenna Design

QFH Antenna Structure

QFH Antenna Inner Structure

The antenna that will be used in the real case is Quadrifilar Helix (QFH) Antenna. The first prototype of antenna was created using easily available materials like PVC pipes and aluminum rods.

Step 6: Outdoor Communications Test

Transmitter

Receiver

The transmission and reception of measured data packets were tested in a range of 1.5 km. Correct data packets were received. A future task will to be work on the implementation of electric power system.

END OF *GST COLUMN NO. 2*

18. Report from Paraguay

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

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

Newsletter

News from Paraguay
November 2020

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

Working on the BIRDS-4 Ground Station!

Contributor: J. Ferrer

CaBuReI4S team members Javier Ferrer and Luis Miranda manage the antenna building process. Now it’s time to start the verification procedures, working on software development on the Raspberry Pi to gather sensor data and then send them to the GuaraniSat.

This antenna will be handy for BIRDS-4, BIRDS-5, KITSUNE, and other projects where CABURE’I team and AEP will be working!

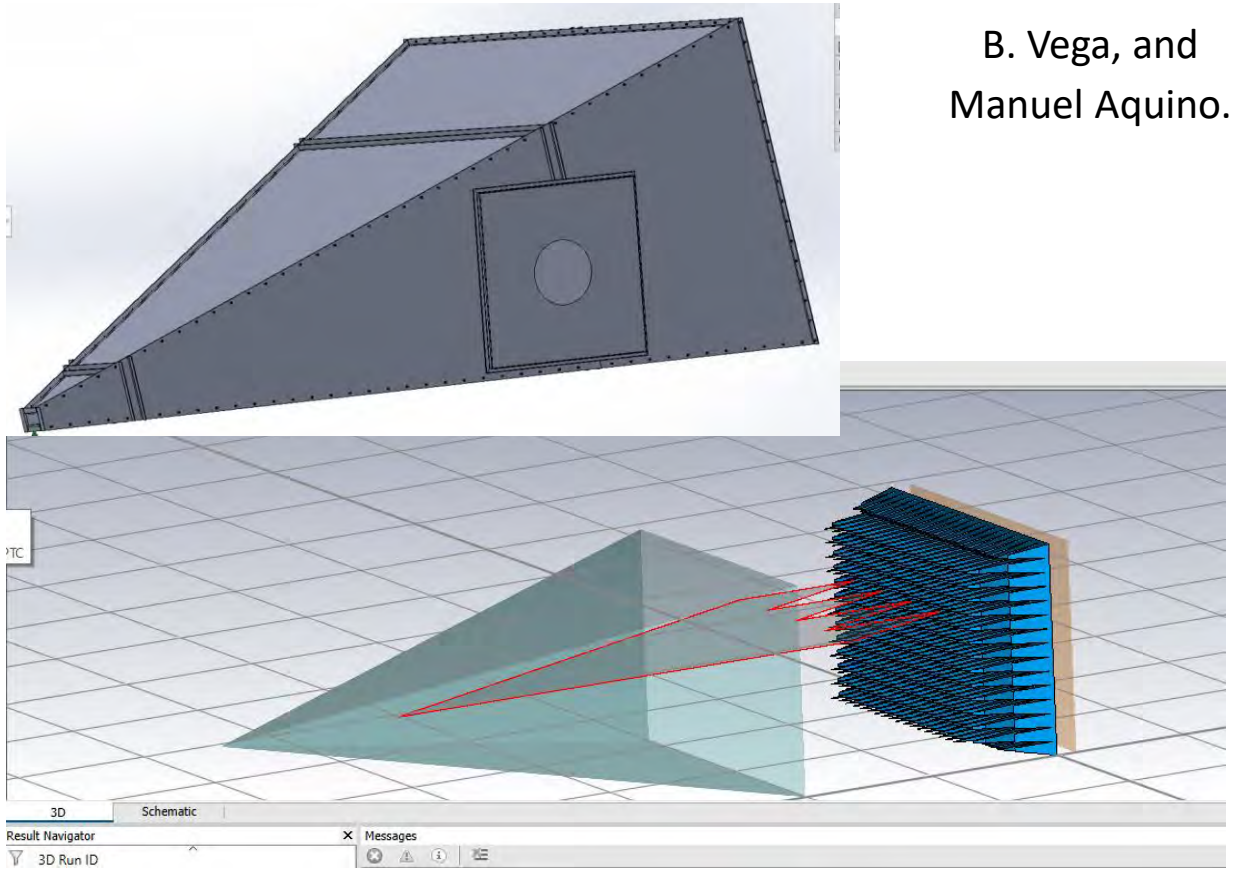
Keep it up, team!

The “CABURE+I 4S” Project Newsletter

News from Paraguay

Collaboration with FIUNA!

AEP and Faculty of Engineering (FIUNA) members are working on a Transverse Electromagnetic Mode (TEM) cell for studying the biological effects of radiofrequency radiation at a reduced scale and comparing the computed vs. measured values for three significant parameters: scattering parameters, incident electric field distribution, and absorbed power in a set of liquid samples. Successful validation and characterization are achieved using a CAD finite integration technique (FIT) and a dedicated network analyzer for the experimental setup. We are strengthening ties for future collaborations and projects!



Contributors:
B. Vega, and
Manuel Aquino.

News from Paraguay

Contributor: J. Kurita

Esteban’s journey to Japan!

Esteban Fretes joined the CABUREI team in his senior year. Then he and, his classmate Aldo accepted the challenge to design and build Paraguay’s first ADCS test bench, by request of AEP. Last year, this work was presented at the 2nd IAA Latin American Symposium on Small Satellites. Esteban and Aldo completed his engineering degree this year. He is now flying to Japan, thanks to UNOOSA Post-graduate study on Nano-Satellite Technologies (PNST). We, as CABUREI team members, are very proud of Esteban's achievement!

From left to right, Esteban Fretes, Liduvino Vielman (the president of AEP), Jorge Kurita

From left to right, Diego Stalder, Esteban Fretes, Jorge Kurita, Ruben Lopez (the Dean of the Faculty of Engineering)

END OF REPORT FROM PARAGUAY

19. Local newspaper in Japan writes up the BIRDS Program of Kyutech

（第3種郵便物認可）　2020年（令和2年）10月5日　月曜日　西日本新聞

超小型人工衛星 安く早く

趙・九州工大教授に聞く

九州工業大（戸畑区）がフィリピン、パラグアイの研究機関などと共同で開発し、来年中の打ち上げを目指す3基の超小型人工衛星が完成した。米国の調査会社の調べで、九工大は大学や研究機関では小型衛星の打ち上げ実績で「世界一」とされる。どんな分野で活用し、今後、どんなことができるようになるのか。開発をまとめる趙孟佑教授(57)に聞いた。（古瀬哲裕）

九州工業大がフィリピン、パラグアイの研究機関などと共同で開発し、報道陣に公開した超小型人工衛星

■虫の分布調査

今回は1辺約10㌢四方、重さ約1・2㌔の衛星を打ち上げ、中南米で死者が多い感染症「シャーガス病」を媒介する虫「サシガメ」の生息分布の調査に利用する。

虫の調査に衛星をどう使うのだろうか。

趙教授は「データの内容によっては衛星を利用した方が、地上に通信網を作るより効率的」と話す。

衛星が担うのは地上に設置した虫取り機から、捕まえた数量などのデータを自動的に収集する作業。衛星を経由して地上のアンテナで受け取って処理すれば、分布が推測できる。

「根底から生活変える可能性」

衛星を利用すれば携帯電話の電波が届かない砂漠や山岳などのへき地からでも容易に情報を集められるという。

■ひらめき形に

今回の調査目的はパラグアイ側から提案があり、3年程度で打ち上げが実現する見通しだ。

「とにかく安く、早く打ち上げる。ひらめきを形にするのに、あまりに時間がかかってきた」。趙教授は、今後の課題をこう語る。

国家主導で造る衛星は高性能だが非常に高価だ。しかし、目的が限定される超小型衛星にそこまでの性能は不要だという。

一辺約10㌢四方の超小型人工衛星

リポート2020

2020.11.05

「活用アイデアの創出が課題」

衛星は接着剤や太陽電池パネルを除く主要な部材は通信販売などで入手した市販品を使った結果、材料費が1基300万円程度と、5年ほど前の半額以下に抑えることができた。

今回はさらに接着剤を市販品で代替できるかを試験する。宇宙での極端な温度変化に耐える特殊な性能が求められる接着剤は1㌔で約50万円。だが市販品なら1㌔数千まで価格を下げられ、調達も簡単だ。

■広がる可能性

次の研究課題は、何だろうか。

趙教授は一例として「コンステレーション」を挙げた。同じ目的を持った衛星を多数打ち上げてネットワークをつくるもので、スマホなどの測位に欠かせない衛星利用測位システム（GPS）もこの一種だ。

海外では既に小型衛星のコンステレーションを使ったビジネスも生まれている。超小型衛星の価格をさらに下げることで農業や土地調査など幅広い分野に新事業が生まれる可能性があり、衛星活用のアイデアを掘り起こすことが大きな課題だという。

趙教授は「宇宙でしかできないデータ収集が、私たちの暮らしを根底から変えるかもしれない」と期待を込めた。

Nano-satellites …

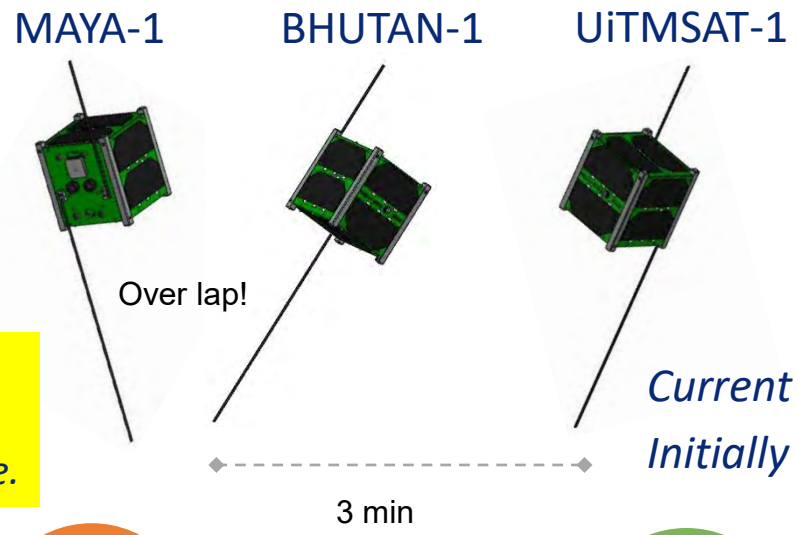
… cheaper, faster

西日本新聞

https://www.nishinippon.co.jp/

20. BIRDS-2 health status: Nov. 13th, 2020 (826 days)

Current altitude:
BT: **234 km**
PH: **240 km**
MY: **240 km**



Article prepared by:

Muhammad Hasif Bin Azami

14th November 2020

The altitude has decreased quicker than the prediction!
Reduced about ~6 km compared to the day before.

Current position of the BIRDS-2
Initially was Bhutan-1, Maya-1, and UiTMSAT-1

Battery voltage (V)**:** 4.16 [BT] /4.12 [PH] /4.10 [MY]
Battery temp. (°C): 11.0 [BT] /11.0 [PH] /11.0 [MY]

OBC temp. (°C) : 15.0 [BT] /14.0 [PH] /13.0 [MY]
COM temp. (°C) : 14.0 [BT] /12.0 [PH] /14.0 [MY]

Operator works
BT: CW & Uplink cmd
PH: CW & Uplink cmd
MY: CW, Uplink cmd & monitor APRS digipeater

Status of GS
Kyutech: Operational
BT: Operational
PH: Operational
MY: Maintanence

Calculation of free-space path loss (FSPL)

Elevation	Range(h=250km)[km]	Range(h=400km)[km]	FSPL(h=250km)[dB]	FSPL(h=400km)[dB]	delta[dB]
0	1802	2293	150	152	2.1
10	1008	1439	145	148	3.1
20	649	984	141	145	3.6
30	474	739	139	143	3.9
40	379	598	137	141	4.0
50	322	512	135	139	4.0
60	287	457	134	138	4.1
70	265	424	134	138	4.1
80	254	406	133	137	4.1
90	250	400	133	137	4.1

Calculation made by Nakayama (BIRDS-4)

Elevation more than 30° has difference of > 4 dB.

Thus, the successful uplink command should be improved in current altitude theoretically.

The remaining BIRDS-2 members in Kyutech will try as much as possible to do the satellite operations.

We are also hoping the rest of BIRDS GS network continue supporting us, thank you very much in advance!

END OF BIRDS-2 REPORT BY AZAMI

UiTMSAT COLUMN

Column No. 11

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

UNIVERSITI TEKNOLOGI MARA

UiTM Sentiasa Di Hatiku
"UiTM Always in My Heart"

AGENSI ANGKASA MALAYSIA
KEMENTERIAN SAINS, TEKNOLOGI DAN INOVASI

UiTM'S TEAMS IN SISWASAT2020

In May 2020 issue, I had written about the SiswaSAT2020, a national competition for university students in Malaysia to develop and launch a miniature or can-sized satellite. The competition, organized by Malaysian Space Agency (MYSA), commenced on 18th May 2020 and involved all stages of satellite development including MDR, PDR, and CDR.

Due to the issues of pandemic outbreak and movement restrictions implementation in the country, the competition that was scheduled to have physical launching in October 2020 has been conducted via virtual launching presentation.

MALAYSIA SISWASAT COMPETITION 2020

On 13th October 2020, three (3) teams from UiTM; Andromeda, Electra, and Volta, have been selected to present their cansat virtually after they have passed all three (3) satellite development stages; MDR, PDR, and CDR. In order to prove the functionality of the developed cansats to the panels during the final presentation on the online platform, the teams had decided to present at open space area and used the camera to capture all the live activities.

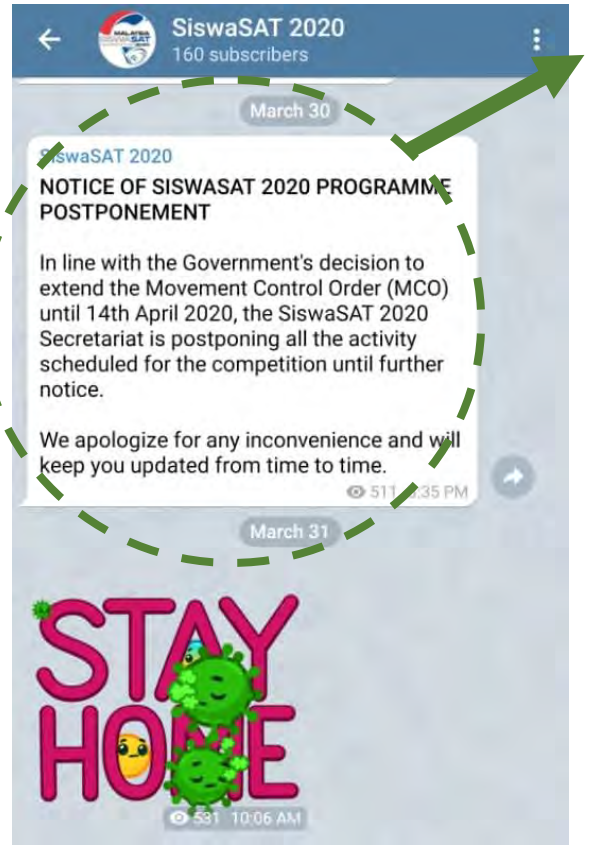
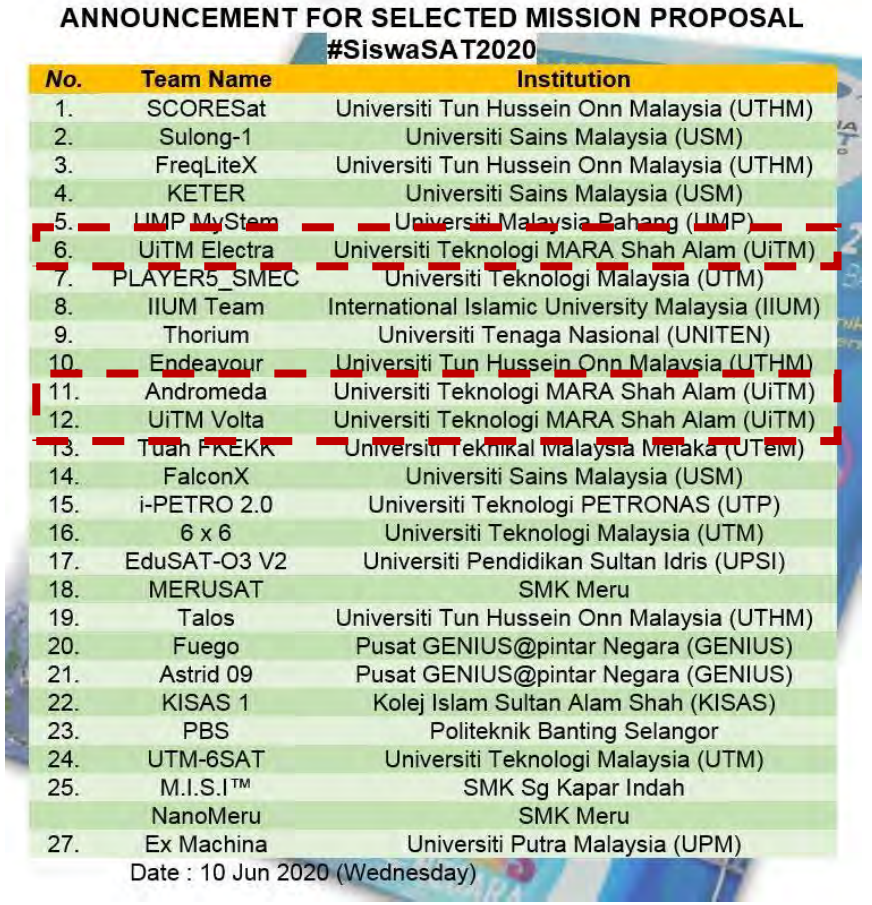


Fig. 1: Secretariat of SiswaSAT2020 from MYSA has been using the application of Telegram as a medium of communication with all participants of the competition. This is an example of a postponement notice due to pandemic and movement restriction.



ANNOUNCEMENT FOR SELECTED MISSION PROPOSAL
#SiswaSAT2020

No.	Team Name	Institution
1.	SCORESat	Universiti Tun Hussein Onn Malaysia (UTHM)
2.	Sulong-1	Universiti Sains Malaysia (USM)
3.	FreqLiteX	Universiti Tun Hussein Onn Malaysia (UTHM)
4.	KETER	Universiti Sains Malaysia (USM)
5.	UMP MyStem	Universiti Malaysia Pahang (UMP)
6.	UiTM Electra	Universiti Teknologi MARA Shah Alam (UiTM)
7.	PLAYER5_SMEC	Universiti Teknologi Malaysia (UTM)
8.	IIUM Team	International Islamic University Malaysia (IIUM)
9.	Thorium	Universiti Tenaga Nasional (UNITEN)
10.	Endeavour	Universiti Tun Hussein Onn Malaysia (UTHM)
11.	Andromeda	Universiti Teknologi MARA Shah Alam (UiTM)
12.	UiTM Volta	Universiti Teknologi MARA Shah Alam (UiTM)
13.	Tuah FKEKK	Universiti Teknikal Malaysia Melaka (UTeM)
14.	FalconX	Universiti Sains Malaysia (USM)
15.	i-PETRO 2.0	Universiti Teknologi PETRONAS (UTP)
16.	6 x 6	Universiti Teknologi Malaysia (UTM)
17.	EduSAT-O3 V2	Universiti Pendidikan Sultan Idris (UPSI)
18.	MERUSAT	SMK Meru
19.	Talos	Universiti Tun Hussein Onn Malaysia (UTHM)
20.	Fuego	Pusat GENIUS@pintar Negara (GENIUS)
21.	Astrid 09	Pusat GENIUS@pintar Negara (GENIUS)
22.	KISAS 1	Kolej Islam Sultan Alam Shah (KISAS)
23.	PBS	Politeknik Banting Selangor
24.	UTM-6SAT	Universiti Teknologi Malaysia (UTM)
25.	M.I.S.I™	SMK Sg Kapar Indah
	NanoMeru	SMK Meru
27.	Ex Machina	Universiti Putra Malaysia (UPM)

Date : 10 Jun 2020 (Wednesday)

Fig. 2: An announcement showed that all three (3) teams of UiTM had been selected to proceed with PDR stage. This means the teams' MDR reports had been successfully accepted after the reviews were made by MYSA.

No.	Team Name	Institution
1.	Thorium	Universiti Tenaga Nasional (UNITEN)
2.	PLAYER5_SMEC	Universiti Teknologi Malaysia (UTM)
3.	SCORESat	Universiti Tun Hussein Onn Malaysia (UTHM)
4.	KETER	Universiti Sains Malaysia (USM)
5.	UMP MyStem	Universiti Malaysia Pahang (UMP)
6.	UiTM Electra	Universiti Teknologi MARA Shah Alam (UiTM)
7.	Sulong-1	Universiti Sains Malaysia (USM)
8.	Tuah FKEKK	Universiti Teknikal Malaysia Melaka (UTeM)
9.	UiTM Volta	Universiti Teknologi MARA Shah Alam (UiTM)
10.	IIUM Team	International Islamic University Malaysia (IIUM)
11.	i-PETRO 2.0	Universiti Teknologi PETRONAS (UTP)
12.	PBS	Politeknik Banting Selangor
13.	FalconX	Universiti Sains Malaysia (USM)
14.	Endeavour	Universiti Tun Hussein Onn Malaysia (UTHM)
15.	Andromeda	Universiti Teknologi MARA Shah Alam (UiTM)
16.	6 x 6	Universiti Teknologi Malaysia (UTM)
17.	Astrid 09	Pusat GENIUS@pintar Negara (GENIUS)
18.	MERUSAT	SMK Meru
19.	M.I.S.I™	SMK Sg Kapar Indah
20.	KISAS 1	Kolej Islam Sultan Alam Shah (KISAS)
21.	Fuego	Pusat GENIUS@pintar Negara (GENIUS)
22.	NanoMeru	SMK Meru

Fig. 3: Announcement on teams that passed the PDR stage and required to proceed with CDR. UiTM teams are highlighted in red-dashed box.

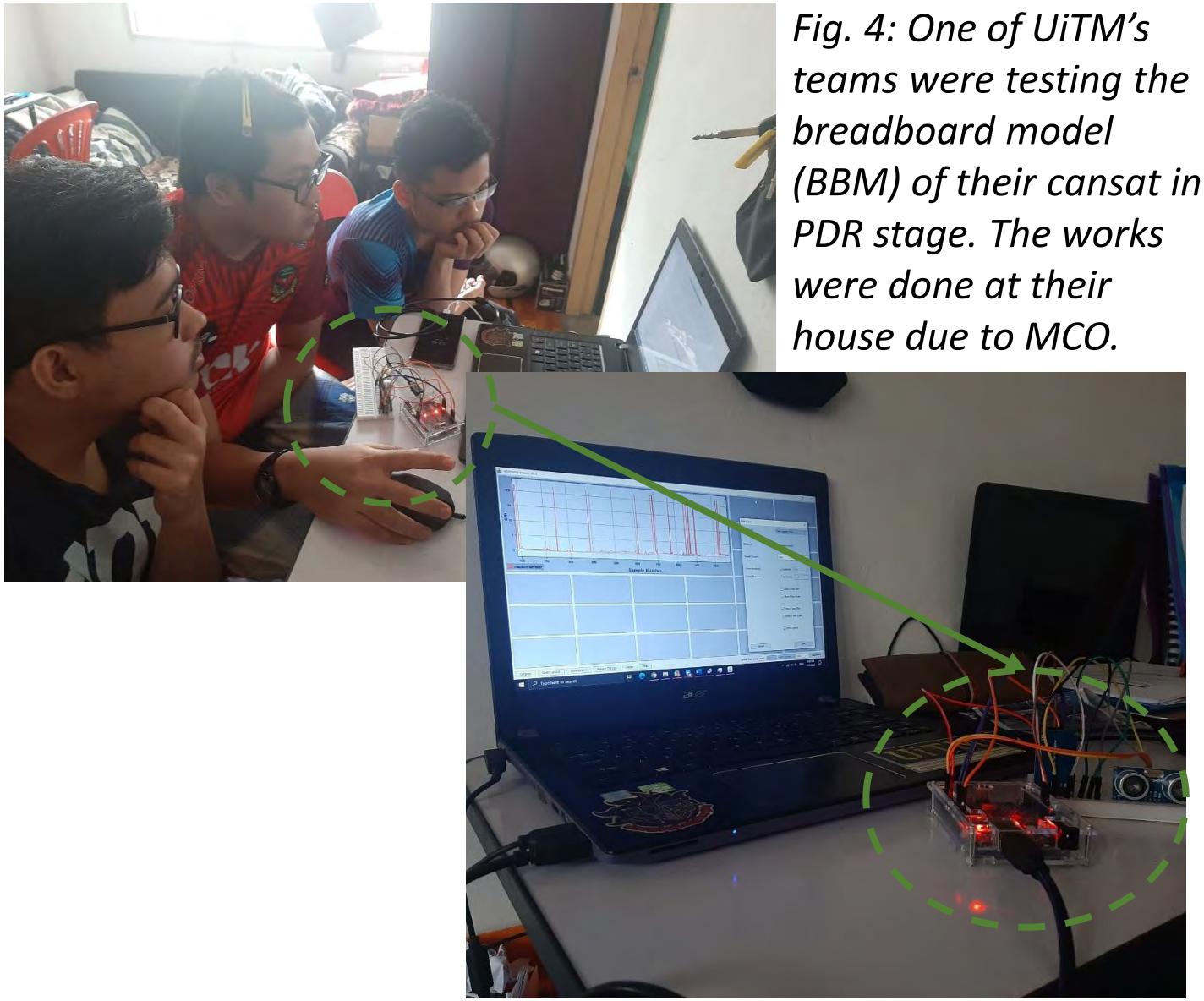


Fig. 4: One of UiTM's teams were testing the breadboard model (BBM) of their cansat in PDR stage. The works were done at their house due to MCO.

Fig. 5: The teams were performing the outdoor communication testing. This was during the conditional MCO. They were allowed to enter the university compound with application letter.

Fig. 6: Since there was no physical launching but the teams were still required to present and prove their functioning cansat at 200 m height. Therefore, the teams decided to put their cansats at 200 m distance away from the developed ground terminal (laptop). This was to show that the telemetry data and images captured from the cansat can be sent to the ground station at 200 m distance. The member of the teams were measuring the distance for 200 m. the location must be free from buildings and trees to ensure the LOS transmission.

Fig. 7: The virtual platform was used for the final presentation.

Parachute: Since there was no deployment at 200 m height, the parachute was programmed to deploy after few minutes (time-dependant)

Fig. 8: One of the UiTM's teams during the final presentation. They were presenting their cansat at the open space area in order to show the working cansat directly to all panels on the virtual platform.

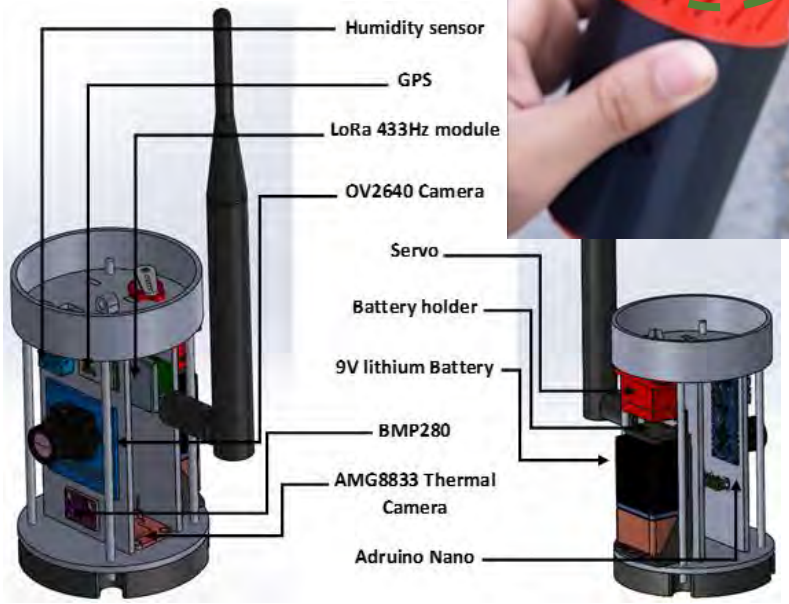


Fig. 9: This was one of the cansats developed by the team. All subsystems including the missions systems were integrated inside. There was parachute attached on top of the structure.

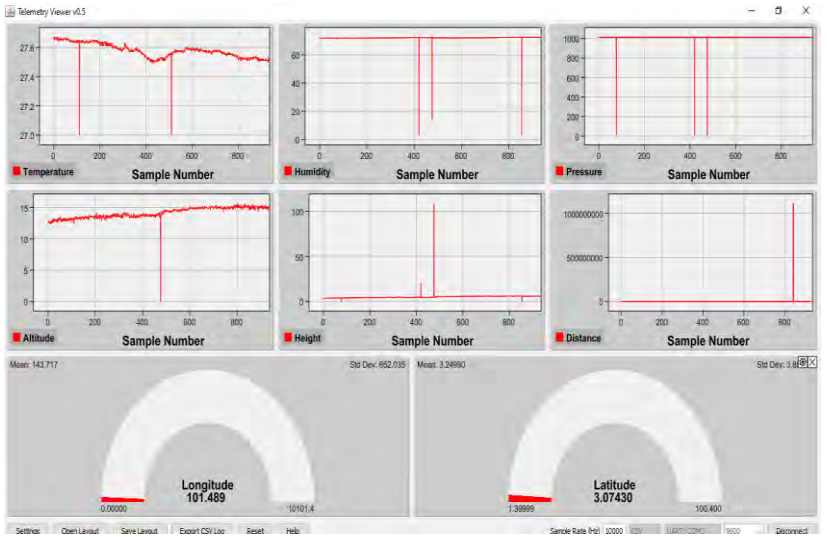


Fig. 10: Telemetry viewer was used as the ground terminal to receive the telemetry data from the cansat.

Fig. 11: The open space area where the cansat was put 200 m away from the presentation station as shown in Fig. 8

END OF COLUMN #11 FROM MALAYSIA

The Center for Nanosatellite Testing (CeNT) at the Kyushu Institute of Technology (九州工業大学)

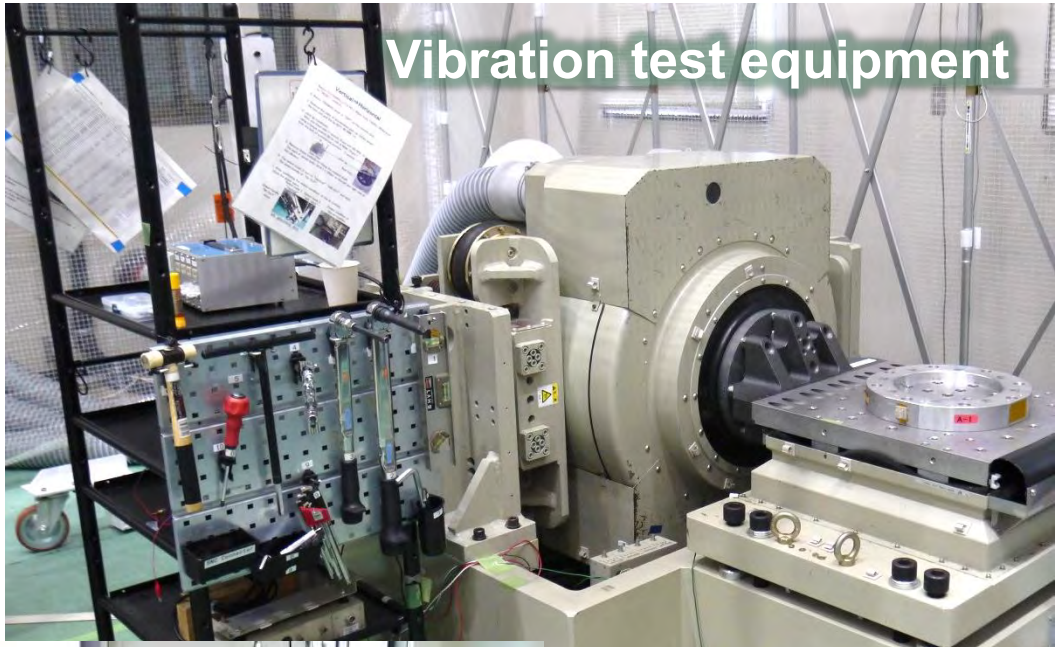
Written by
Joseph Ampadu Ofosu, Ph.D.
Center for Nanosatellite Testing
Kyushu Institute of Technology
1-1 Sensui, Tobata-Ku, Kitakyushu
JAPAN

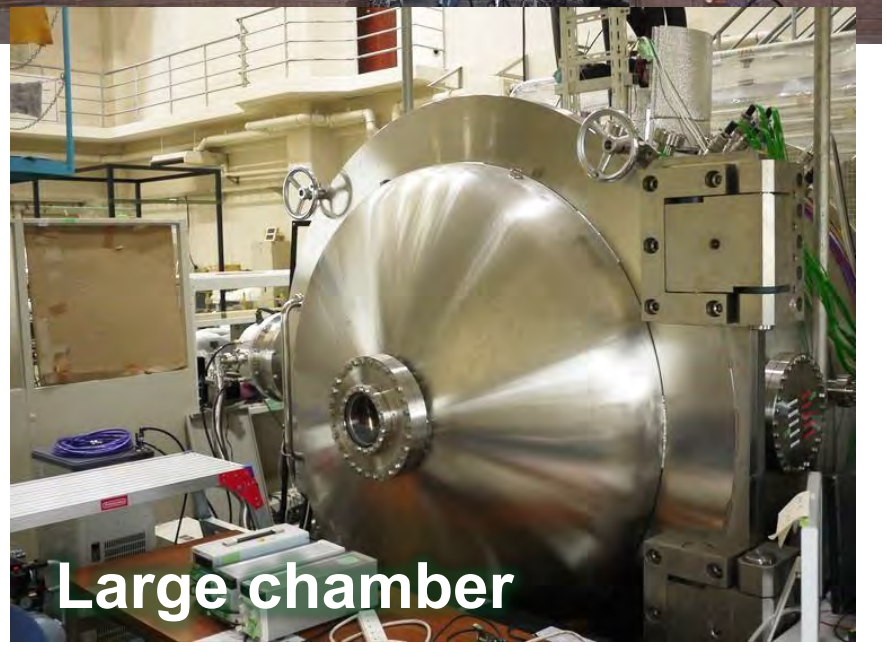
16 November 2020

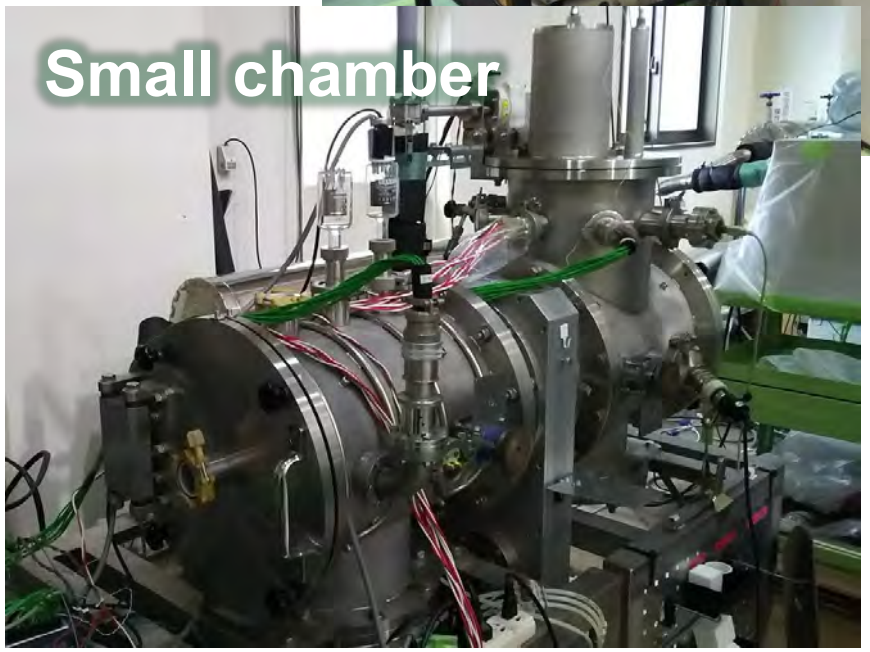
What is CeNT and its Purpose? *(by J. A. Ofosu)*

- The Center for Nanosatellite Testing (CeNT) at the Kyushu Institute of Technology is equipped with standard facilities for the environmental test of satellites. As the name suggests, the facilities at CeNT are mainly for nanosatellites with max side length of 50 cm and mass of up to 50 kg. Users of CeNT are mainly space corporations/ companies, academic & research institutions, as well as governmental agencies. CeNT also specialises in assisting new entrants into the space field with nanosatellite development.
- The environmental tests provided at CeNT includes:
  - Out-gas
  - Thermal vacuum, thermal shock and thermal cycle
  - Shock and vibration
- With the experience and rich heritage that CeNT has gleaned over the years from both domestic and international users, nanosatellite developers can be rest assured of the test quality and data integrity that is provided.
- For more information please see this link: https://kyutech-cent.net/index_e.html

CeNT Frontview







End of this CeNT overview

23. UNISEC-Global is conducting a virtual meeting each month -- you can join them

Meeting results and meeting announcements are here: http://www.unisec-global.org/virtual-meeting.html

UNISEC GLOBAL
University Space Engineering Consortium

Home | Meeting | Contests | Links | Local Activities

Home > Meetings > Virtual Meeting

Virtual Meeting

3rd Meeting

The 3rd Virtual UNISEC-Global Meeting

Date: November 14, 2020

Click for Registration

Click for Program

Generally, these meetings occur on the 2nd Saturday of each month, and we get between 80 and 100 participants from all over the world. We ask that you register before joining each meeting; use the link shown above. Each meeting starts at 10:00 PM and ends a midnight (Japan Time).

The 1st Virtual UNISEC-Global Meeting

Date: September 12, 2020

Moderator: Mansur Celebi, Sabanci University, UNISEC-Turkey

Presentation
Opening Remarks KAWASHIMA Rei, UNISEC-Global
When collaboration (cooperation) works more than competition CHO Mengu, Kyushu Institute of Technology, POC of UNISEC-Japan
Expectation to UNISEC-Global Mohammed Khalil Ibrahim, Egyptian Space Agency
CubeSat, Space Education in Nepal and the Question of Moving Forward Abhas Maskey, Kyushu Institute of Technology, on behalf of POC of UNISEC-Nepal (in the founding process)
How COVID-19 is affecting the new space and how engineering education can be realized in difficult time? JUANG Jyh-Ching, National Cheng Kung University, POC of UNISEC-Taiwan

1st Meeting

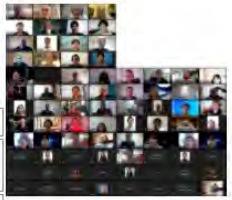
The 2nd Virtual UNISEC-Global Meeting

Date: October 10, 2020

Report

Moderator: MAEDA George, Kyutech, UNISEC-Japan

Movie	Presentation
	Welcome and Opening remarks KAWASHIMA Rei, UNISEC-Global
	Introduction to the 7th Mission Idea Contest (MIC7) - Deep Space Mission NAKASUKA Shinichi, the University of Tokyo
	Mission Design for Deep Space Nano/Micro Spacecraft Utilizing Lunar Orbital Platform-Gateway Opportunities OZAKI Naoya, JAXA/ISAS
	Breakout discussion and sharing Moderator: MAEDA George, Kyutech
	Current situation and future plans of Lebanese universities space programs Amin A.Haj-Al, Lebanese International University, POC of UNISEC-Lebanon (in the founding process)



2nd Meeting

UPDATES FROM THE PHILIPPINES

November 15, 2020
University of the Philippines Diliman
Quezon City, Philippines

PREPARED BY:

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

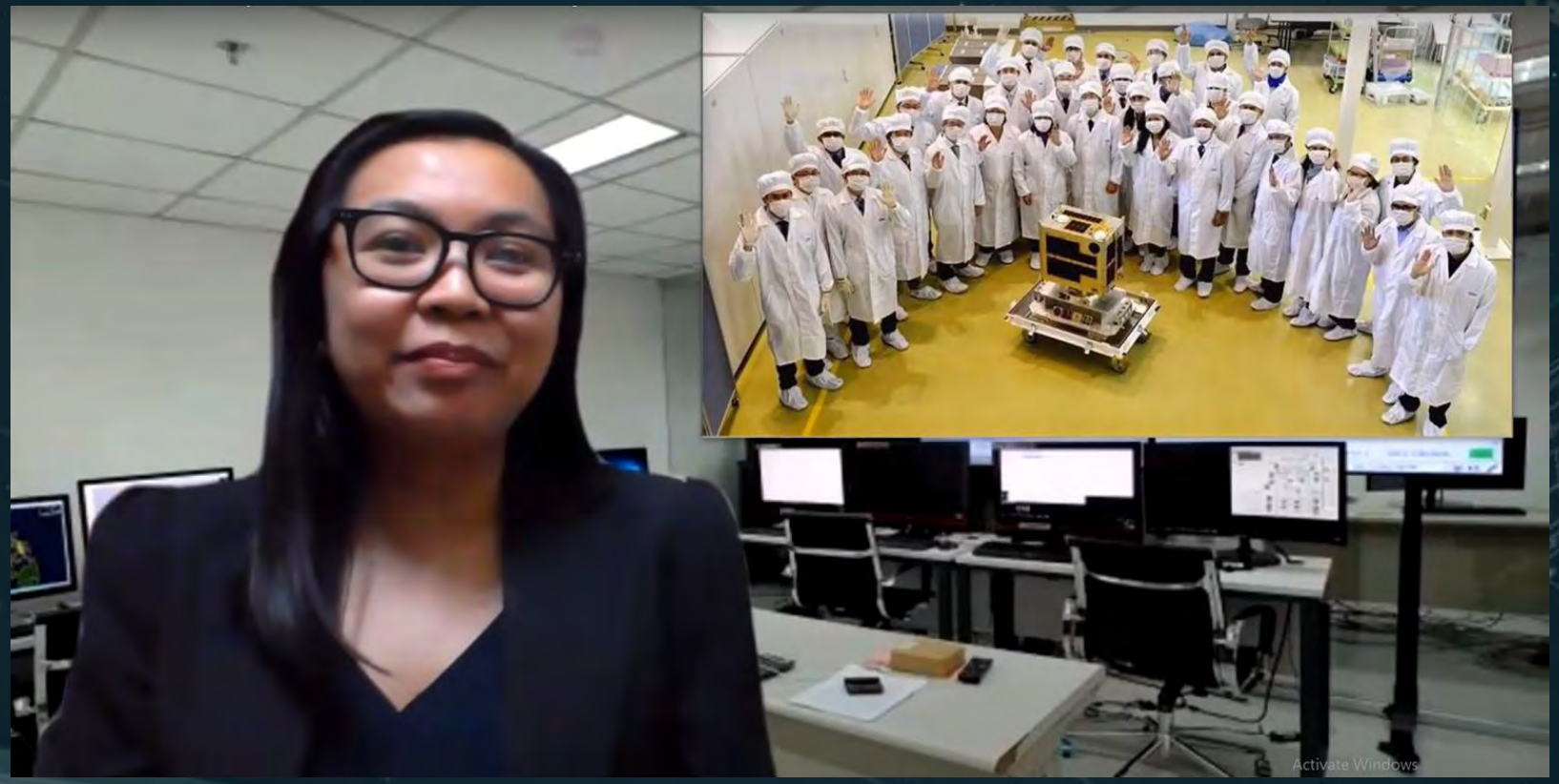
F. Mara Mendoza
STAMINA4Space Project Manager, STeP-UP Project
Contributing Writer and Editor

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

Shaira Panela
Science Writer, ASP Project
Contributing Writer and Editor

Virtual International Astronautical Congress (IAC 2020)

October 13, 2020



Dr. Julie Ann Banatao, Chief Science Research Specialist of the Advanced Satellite Development and Know-How Transfer for the Philippines (ASP) Project, presented in the New Generation Plenary Session of the IAC on October 13, 2020. The session is about the role of Public-Private Partnerships in the sustainability of the space sector.

She provided a perspective on how a developing country like the Philippines kickstarted its journey in space by utilizing international partnerships.

More info here: https://bit.ly/36UGA9N

Watch the video here: https://bit.ly/3kvHXz7

STAMINA4Space Program Leader

named one of the new University of the Philippines Scientists

October 19, 2020

Congratulations to our Program Leader Dr. Gay Jane Perez, University of the Philippines (UP) Diliman College of Science Dean Dr. Giovanni Tapang, and the other newly named UP Scientists!

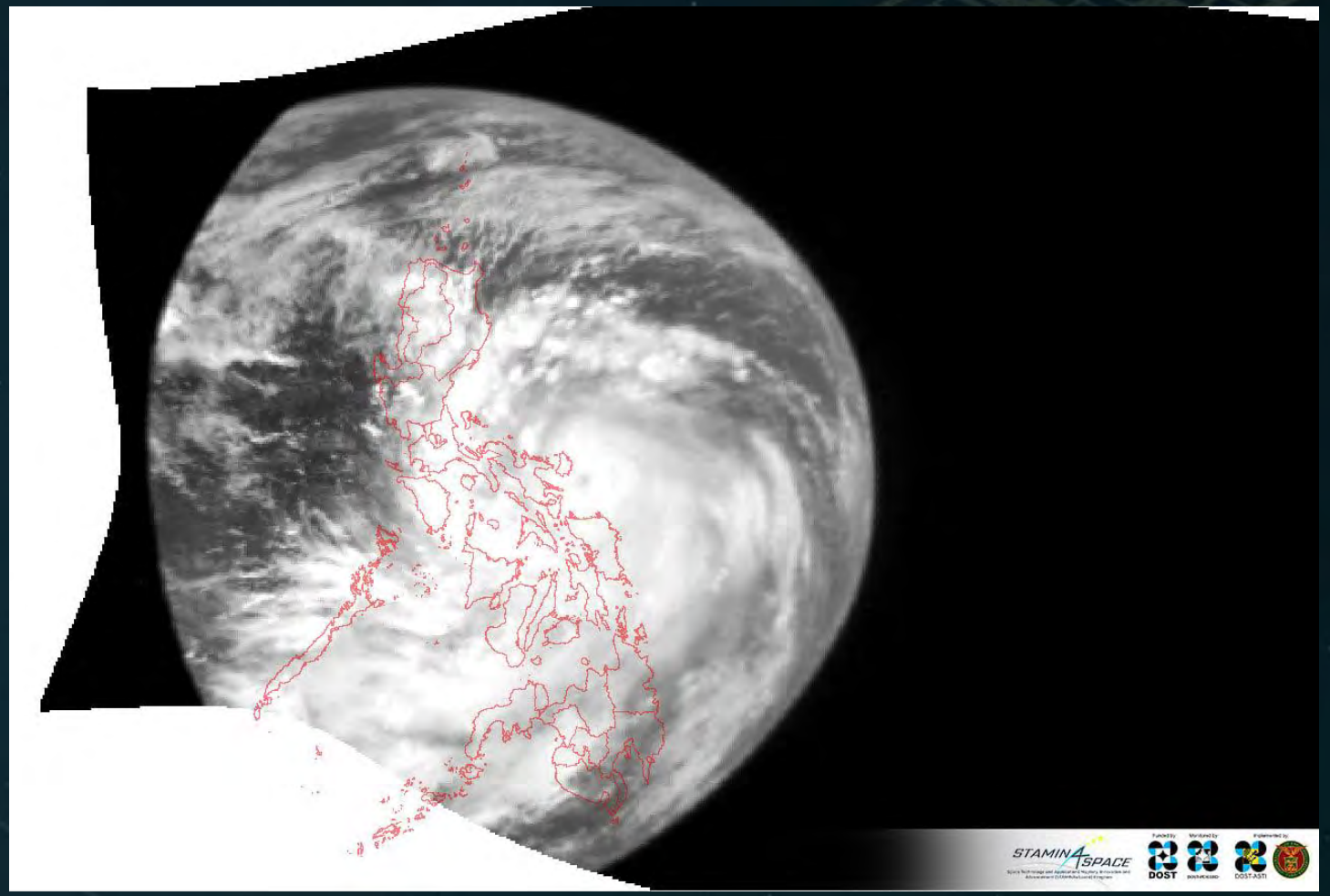
The UP Scientist title is awarded to scientists with the highest productivity rating based on the UP Scientific Productivity System (SPS).

Typhoon Quinta (Molave)

October 27, 2020

Diwata-2 captured Typhoon Quinta (Molave) over the Philippine Area of Responsibility (PAR) on October 25, 2020. STAMINA4Space activated the typhoon mission operation to monitor the typhoon as it passed the country.

The image was taken using Diwata-2's Wide Field Camera (WFC) at around 1:46 PM PHT. Errors in the projection of the image are due to huge distortions related to the image being captured by a fish eye camera on an off-nadir mode.




STAMINA SPACE
Diwata-2
ND YEAR IN SPACE
10.29.2020

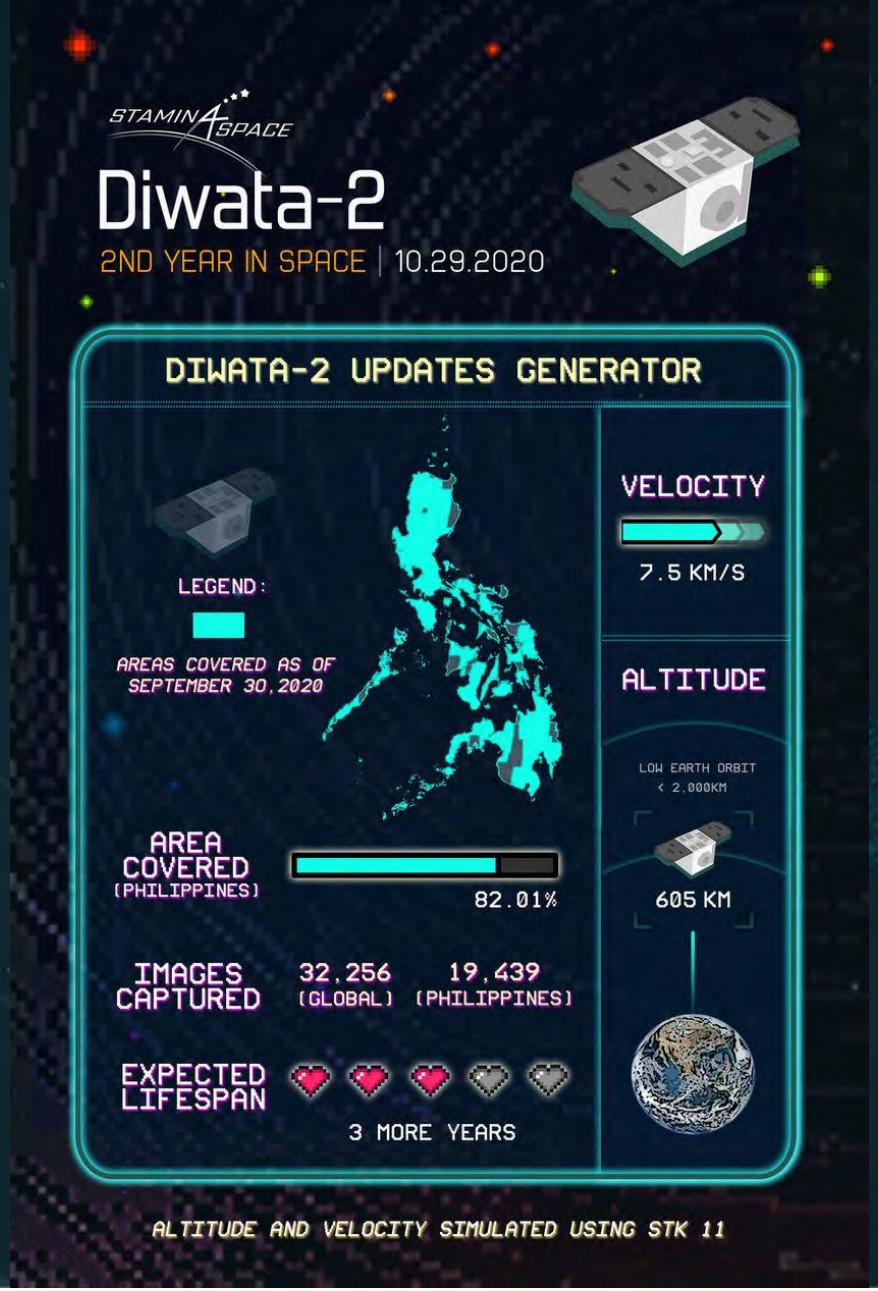
Diwata-2

2nd Year in Space

October 29, 2020

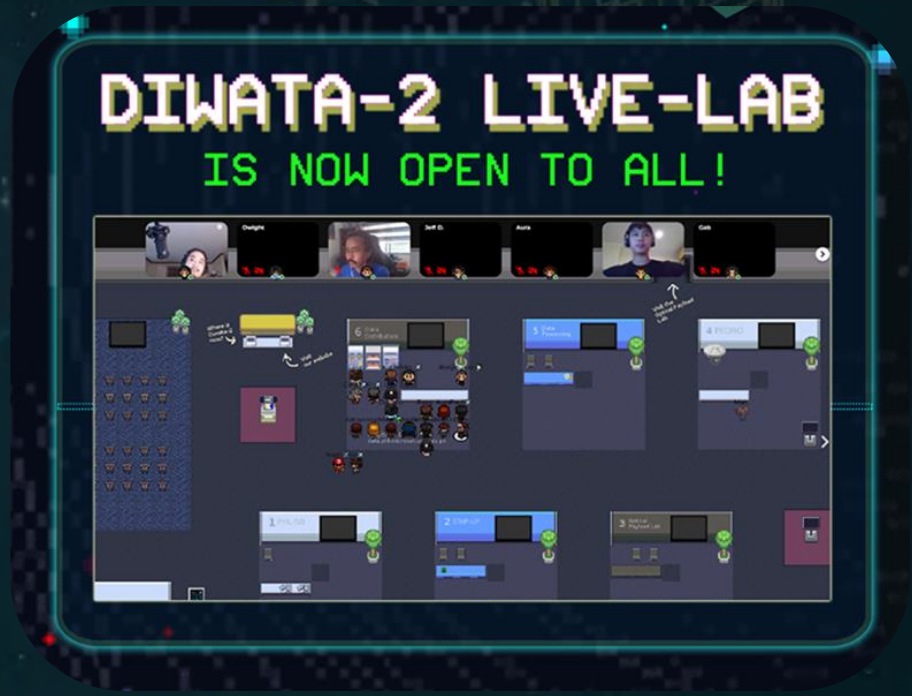
In its two-year journey, Diwata-2 allowed us to take a peek through a typhoon, provided clues on the extent of the Taal Volcano's ashfall, and even took us on a quick sight-seeing trip to the moon.

Read more about Diwata-2's features and developments in its second year in space here: https://bit.ly/3eWSSAo



Explore the platform and see the videos and presentations here: https://bit.ly/2TBOzks

Simply use your arrow keys (computer) or drag your character around the rooms and press/tap ✕ to interact with objects that contain videos or photos.



STAMINA SPACE PHL MICROSAT

Diwata-2

2nd Year in Space

October 29, 2020

Due to the COVID-19 pandemic, we won't be able to open our facilities for tours or physical events. In lieu of that, we've set up "Diwata-2 Live Lab"— a virtual laboratory where we will gather representatives from our different project teams based in the different DOST and UP Diliman institutes: UP Electrical and Electronics Engineering Institute, UPD Institute of Environmental Science and Meteorology (UP-IESM), UPD National Institute of Physics (NIP), UPD Training Center for Applied Geodesy and Photogrammetry (TCAGP), and DOST-Advanced Science and Technology Institute's PEDRO Center.

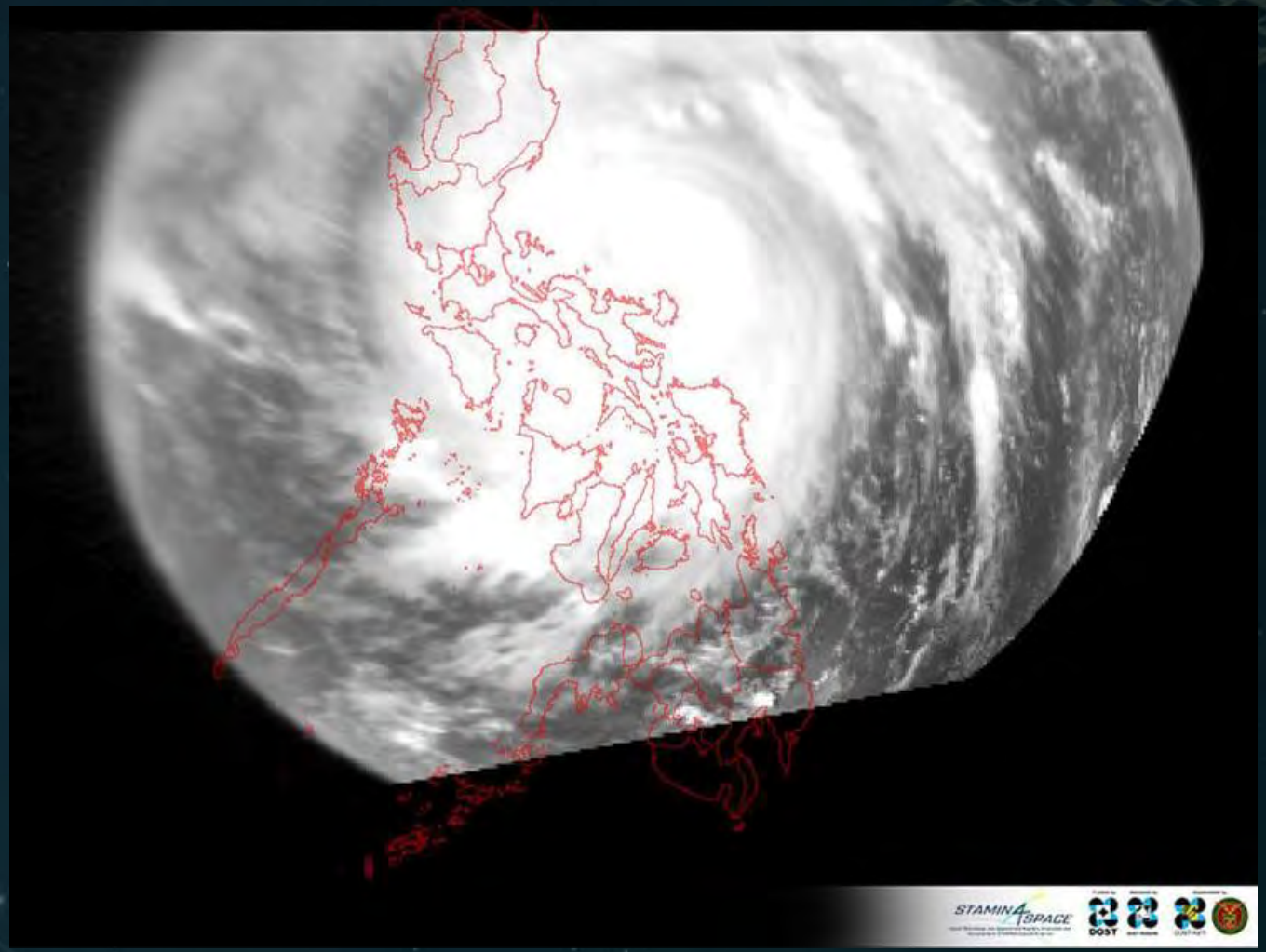
Speakers and moderators <<

Typhoon Ulysses (Vamco)

November 11, 2020

The image was captured using Diwata-2's Wide Field Camera (a fish eye camera) at off-nadir pointing at around 1:06 PM PHT on November 11, 2020. The Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) update around the time of capture places the eye of Typhoon Ulysses at 95 km Northeast of Daet, Camarines Norte, with strength of 135 km/h near the center and gustiness of up to 165 km/h.

Outline of Philippine map overlaid for reference.



Diwata-2 captured this image of Typhoon Ulysses (Vamco) over the Philippine Area of Responsibility (PAR) on November 11, 2020 (Wednesday).

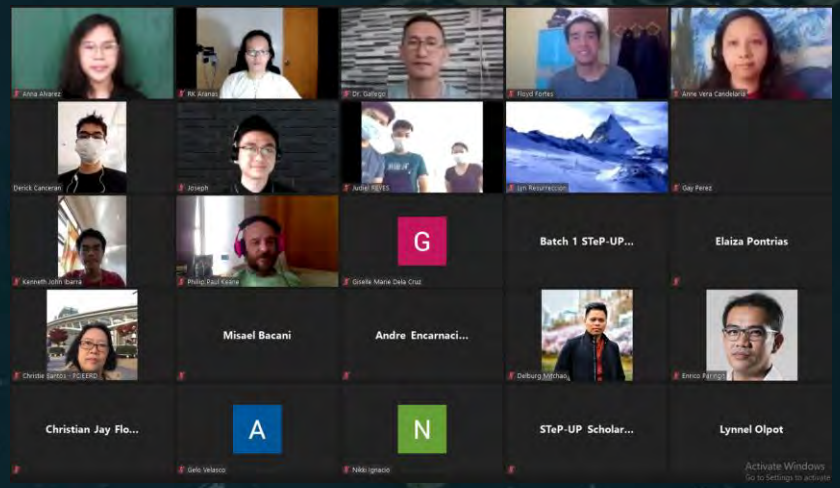
STeP-UP Batch 2 Scholars Kick-Off Meeting

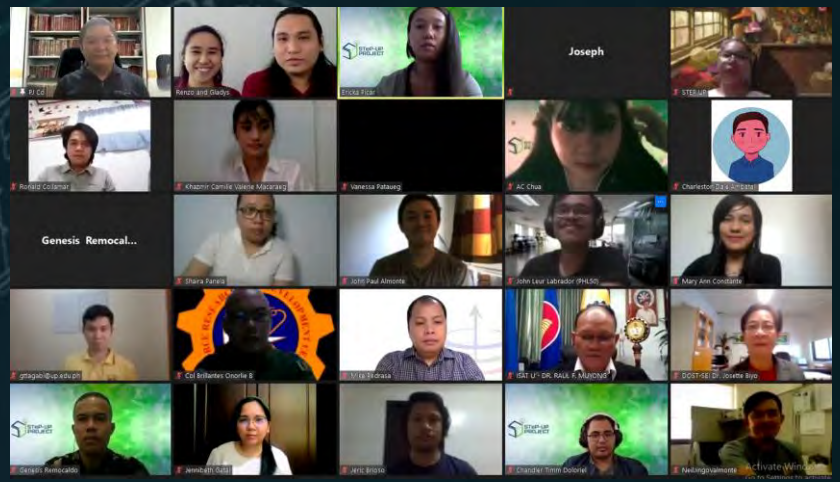
November 06, 2020

The Space Science and Technology Proliferation through University Partnerships (STeP-UP) Project organized a virtual Kickoff Meeting for the STeP-UP Scholars Batch 2 on November 6, 2020. The event aimed to introduce the second batch of scholars and present plans and updates on their activities. It also included a session for updates on Maya-3 and Maya-4, which were presented by the Batch 1 scholars. The event was attended by the scholars, members of the STAMINA4Space program, key offices in the Department of Science and Technology, and media.

Engr. Paul Jason Co
STeP-UP Project Leader
Welcome Message and Introduction

Gladys Bajaro & Renzo Wee
STeP-UP Scholars (Batch 1)
Hosts





Group photos during the meeting

STeP-UP Batch 2 Scholars Kick-Off Meeting

November 06, 2020

Dr. Michael Angelo A. Pedrasa
Director, UP EEEI
Opening Remarks

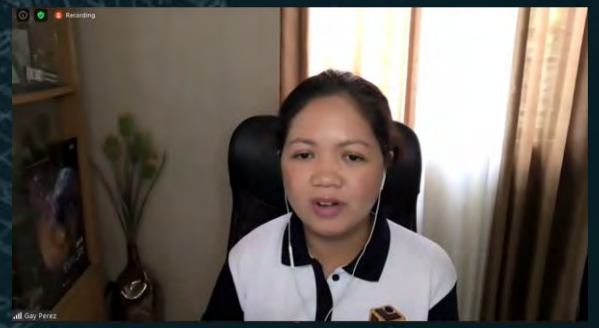
Dr. Joel Joseph Marciano, Jr.
Director General
Philippine Space Agency
Keynote Message

Hon. Fortunato dela Peña
Secretary
Department of Science and Technology
Keynote Message

Dr. Josette Biyo
DOST-SEI Director
Message

Dr. Fidel Nemenzo
Chancellor
University of the Philippines Diliman
Message

Prof. Ferdinand G. Manegdeg
College of Engineering, Dean
University of the Philippines Diliman
Message



Dr. Gay Jane Perez
STAMINA4Space Program Leader
Closing Remarks

STeP-UP Batch 2 Scholars

Angela Clarisse Chua
CAM | ICU | ADCS
Missions Lead

Anna Ruth Alvarez
Communications Subsystem

Khazmir Camille Macaraeg
HNT | ANT
Communications Subsystem Lead

Gio Asher Tagabi
OBC-EX | ADCS
Project Manager | Documentation

Chandler Timm Doloriel
OBC | ICU

Genesis Remocaldo
Structure | Antenna Deployment

Ronald Collamar
TMCR | GLU | EPS | BPB
AIT Lead

Joseph Jonathan Co
SF-WARD | APRS-DP | GS
Subsystems Lead

"Pista ng Mapa"

Space and Ground Data for the Betterment of Human Condition

November 13, 2020

Sarah Jane Sanchez, one of the researchers from our Ground Receiving, Archiving, Science Product Development and Distribution (GRASPED) team, presented about the Diwata-2 tracker (https://youtu.be/TwXSQnlOohs).

From the pistangmapa.github.io:
Pista ng Mapa (Festival of Maps) is a free-of-charge outreach activity activity to generate public interest, advocate the use of open (geo) data, promote free and open source software for geospatial (FOSS4G) (FOSS4G) applications, gather and grow enthusiasts, users in the public and private sector, and local communities in the Philippines, outside of the capital region Metro Manila.

End of report from Philippines

25. Outstanding SEIC Guest Lecture by Mr Kevin Conole of NASA HQ

18 Nov. 2020 via ZOOM

Special Guest Lecture
by
Kevin C. Conole

Senior Program Specialist
Office of International and Interagency Relations
NASA Headquarters
Washington, DC

Title:

United States Leadership at the United Nations Committee on the Peaceful Uses of Outer Space (UN COPUOS)

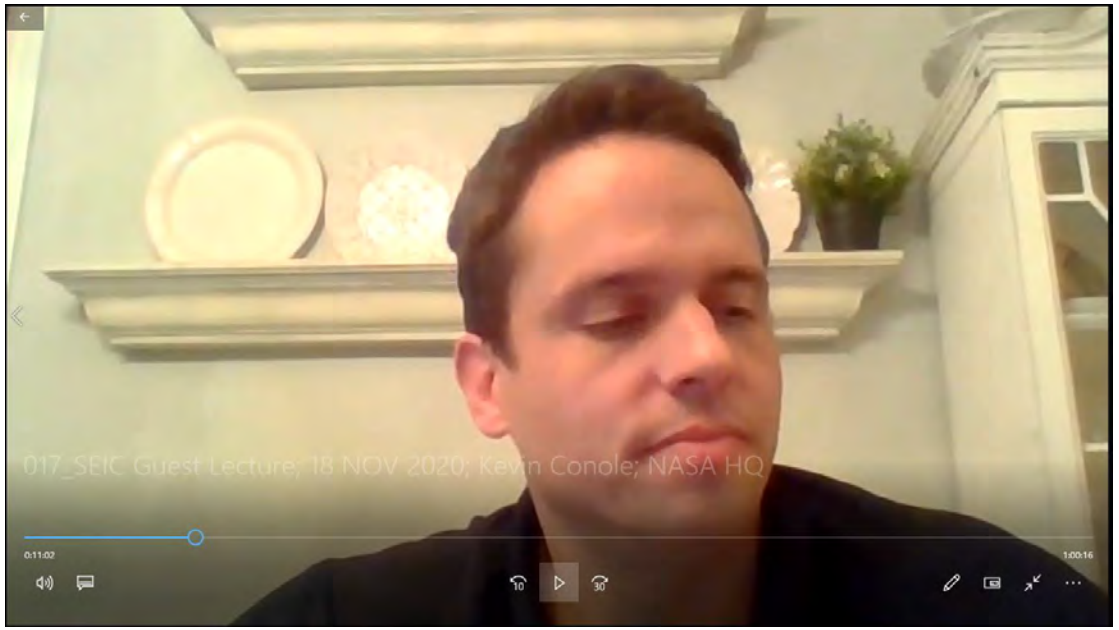
Abstract:

The United States was one of the 51 founding Member States of the UN in 1945 and one of the 18 founding Member States of UN COPUOS in 1959. Since that time, NASA has worked closely with the UN through COPUOS and the UN Office for Outer Space Affairs (OOSA), which is tasked with promoting the peaceful use and exploration of space through international cooperation.

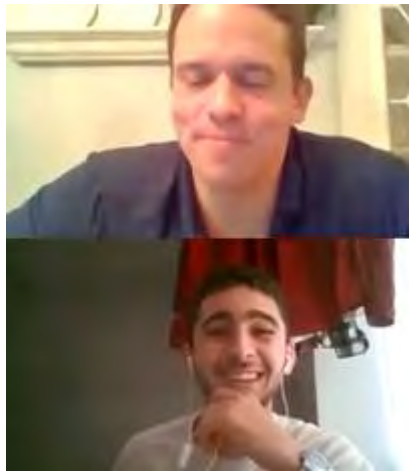
The U.S. views the COPUOS and its two Subcommittees as venues for raising awareness of specific matters that are relevant to the broader international space community. Recent notable historical examples include the Committee's work to develop and promote guidelines for the long-term sustainability of outer space activities and in the areas of space debris mitigation and the safe use of nuclear power sources in outer space. While not seeking restrictive legal regimes to address such issues, the U.S. has pursued, and will continue to pursue, voluntary frameworks for addressing issues that serve as strong encouragement for all nations engaged in space activities to adopt national measures similar to our own. *Such measures provide a balanced approach to the common challenges affecting free and sustainable access to space for all nations.* [Emphasis by G. Maeda]

NASA is finalizing a Memorandum of Understanding with UN OOSA to help further advance this work and which would allow NASA to participate in UN OOSA's Access to Space for All Initiative, which aims "to ensure that the benefits of space are made available to everyone, everywhere," with a focus on "non-space faring and emerging space-faring nations to use and benefit from space technologies and applications, with the support of space-faring nations and different stakeholders."

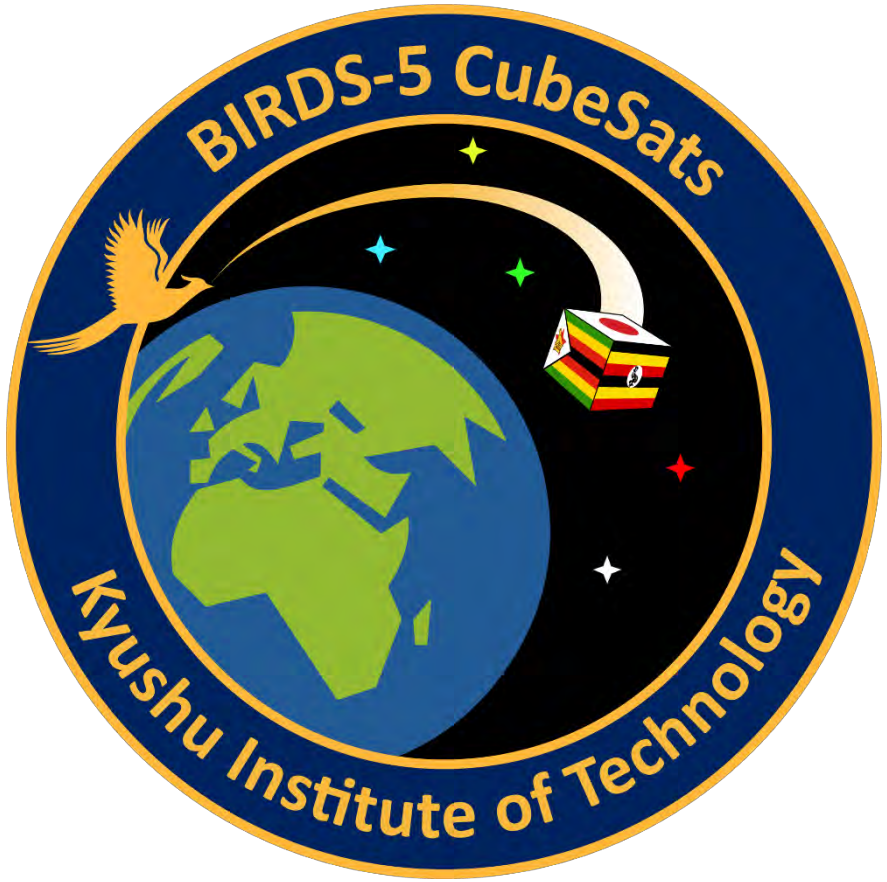
← February of 2018
Mr Conole serving as the Head of the U.S. Delegation to the UN Committee on the Peaceful Uses of Outer Space Scientific and Technical Subcommittee



Mr Conole delivers his presentation from his home from 9:30 PM til 10:30 PM – probably this is his dining room.

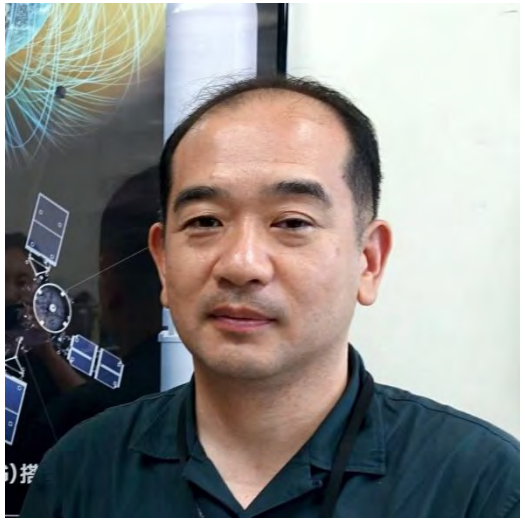


Fahd (BIRDS-5, Morocco) asks the first question to the guest lecturer.



The following are all BIRDS-5 articles for November 2020

Scientific Background of PINO (Particle Instrument for Nano-satellite)



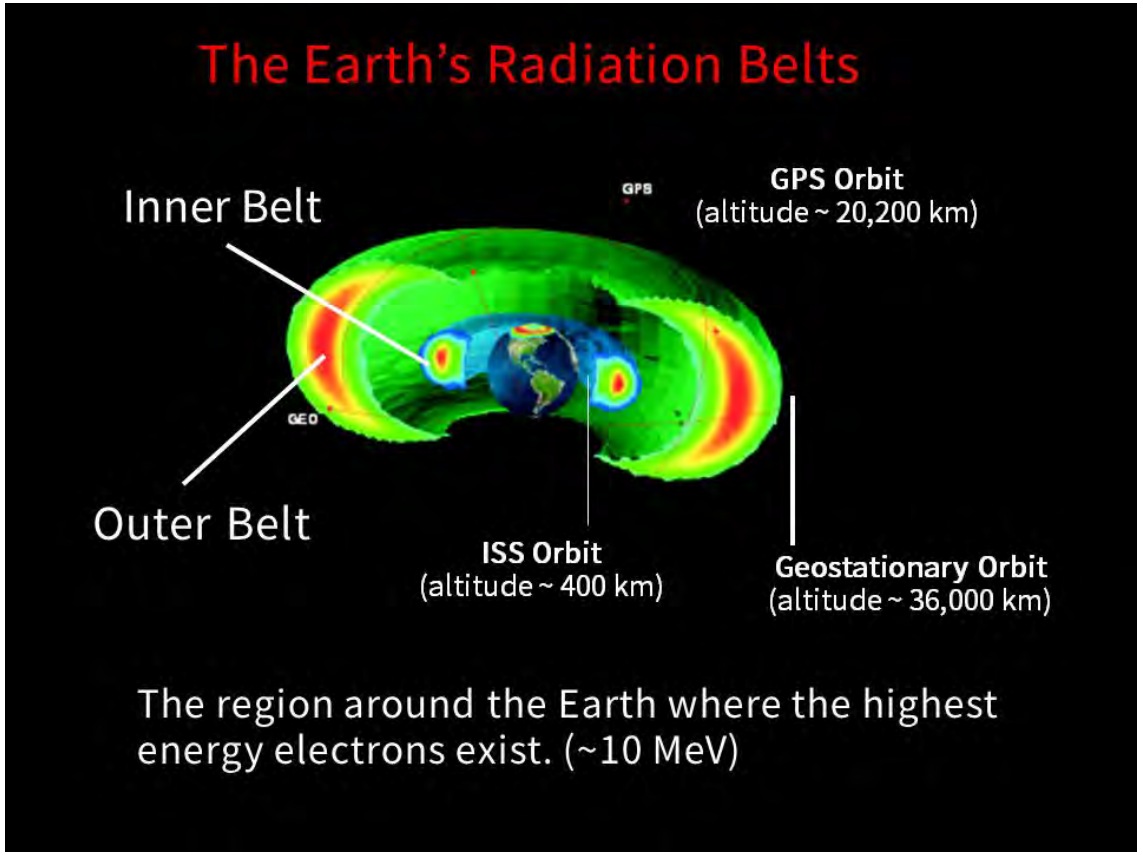
Iku Shinohara, and PINO team

November 14, 2020

What are the Earth's radiation belts?

A scientific objective of the PINO (Particle Instrument for Nano-satellite) mission is to measure at the Low Earth Orbit the high-energy electron flux precipitating along the geomagnetic fields from the radiation belts. In this article, we introduce what our scientific interests in measurement are.

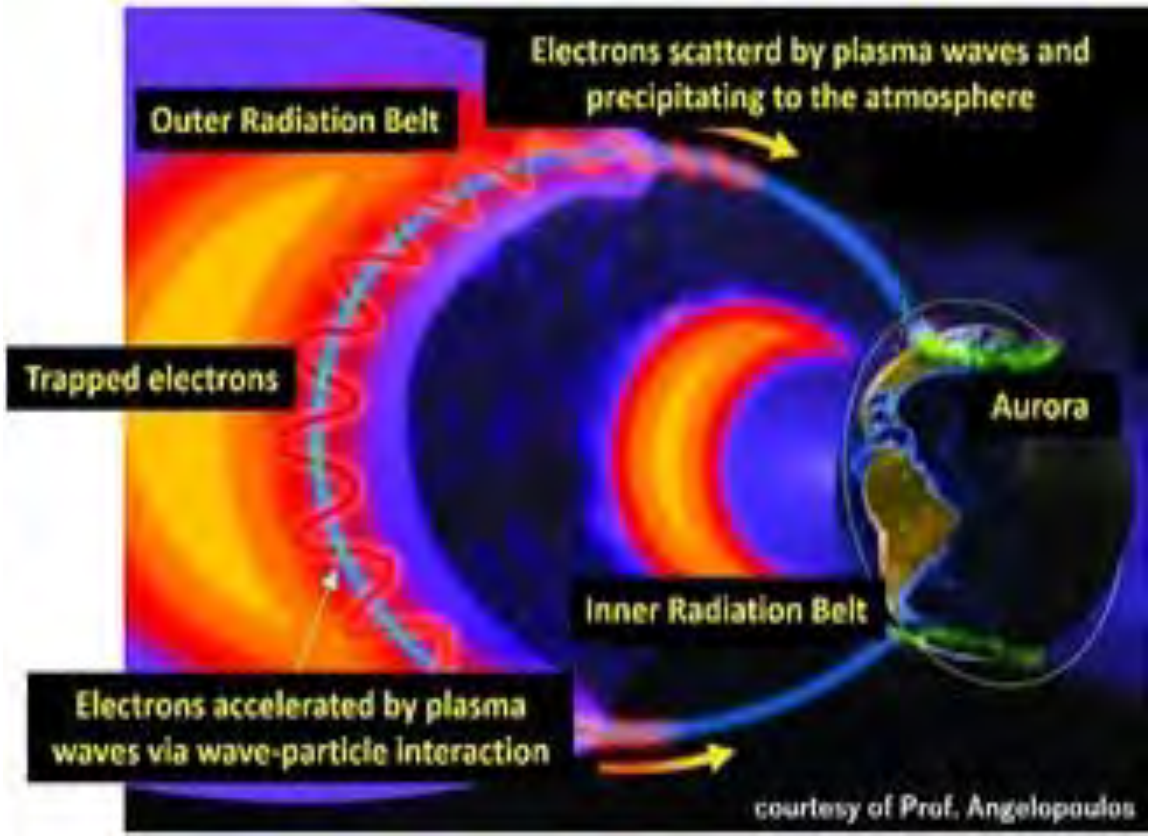
About 60 years ago, the first US satellite Explorer-1 discovered high energy-charged particles in space around the Earth by the onboard radiation detector. The observations by subsequent explorers identified that high energy charged particles are distributed in doughnut shape surrounding Earth. This radiative zone is called the Van Allen belts, named after the discoverer, Dr. James Van Allen of the University of Iowa, US.



Dynamic Variation of the radiation belts

The radiation belts dynamically vary. The amount of high energy charged particles depending on solar activity, especially during magnetic storms. However, since high energy-charged particles in the radiation belts disturb accurate measurements of the charged particles deep inside the radiation belts, it was tough to observe the radiation belts' heart. Consequently, the question, "Why and How do the radiation belts dynamically change?" has been a long-standing scientific mystery.

Recent progress in space technology enables us to challenge the mystery. In 2020's Radiation belt explorers, including the Japanese satellite "Arase," reveal a novel aspect of the radiation belts and how plasma wave-particle interactions contribute to the radiation belts' dynamic variation.



Loss of the radiation belt electrons

PINO will detect such precipitating electrons from the outer radiation belt to the Low Earth Orbit. The precipitation of the outer radiation belt's electrons to the upper-atmosphere is thought to be an important loss process of the outer radiation belt. The high-energy electron precipitation to the upper-atmosphere causes auroral emission. The ground-based aurora observation is an immensely valuable tool to investigate the loss process of the radiation belts. Simultaneous observations between the radiation belt explorers and the aurora imagers significantly contribute to revealing the importance of the plasma wave-particle interaction to the loss process.

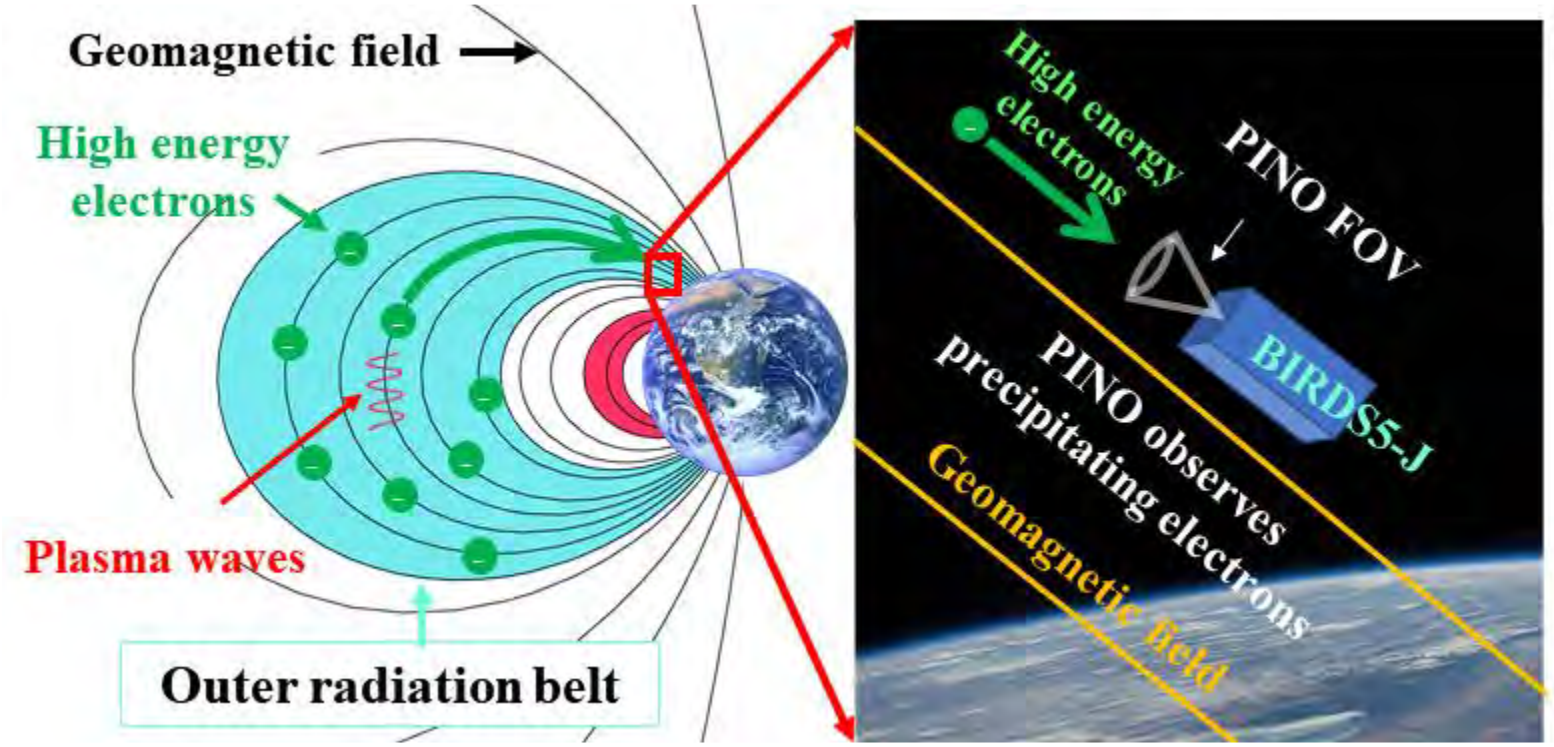
However, observations of higher energy electrons above 100 keV at the Low Earth Orbit are less common. PINO can cover this missing-link. The next page illustrates PINO observation.

An illustration of the ground-based "pulsating aurora" observation. The plasma wave-electron interaction in the outer radiation belt is thought to cause electron precipitation and subsequent auroral pulsation.

Precipitating electrons from the outer belt

1) High energy electrons in the radiation belts are in the bouncing motion along the geomagnetic fields. (Trapped Electrons)
2) Most high energy electrons are reflected at higher altitude points than the BIRDS orbit, and they cannot reach BIRDS.
3) Sometimes, trapped electrons are scattered by plasma waves excited around the magnetic equator, and a part of scattered electrons become able to precipitate into the upper atmosphere along the geomagnetic fields. (Precipitating Electrons)
4) **PINO will detect such precipitating electrons.**

The precipitation to the upper-atmosphere is thought to be an important loss process of the radiation belt electrons.



End of this of PINO article

BIRDS NEST

By: Keenan Chatar

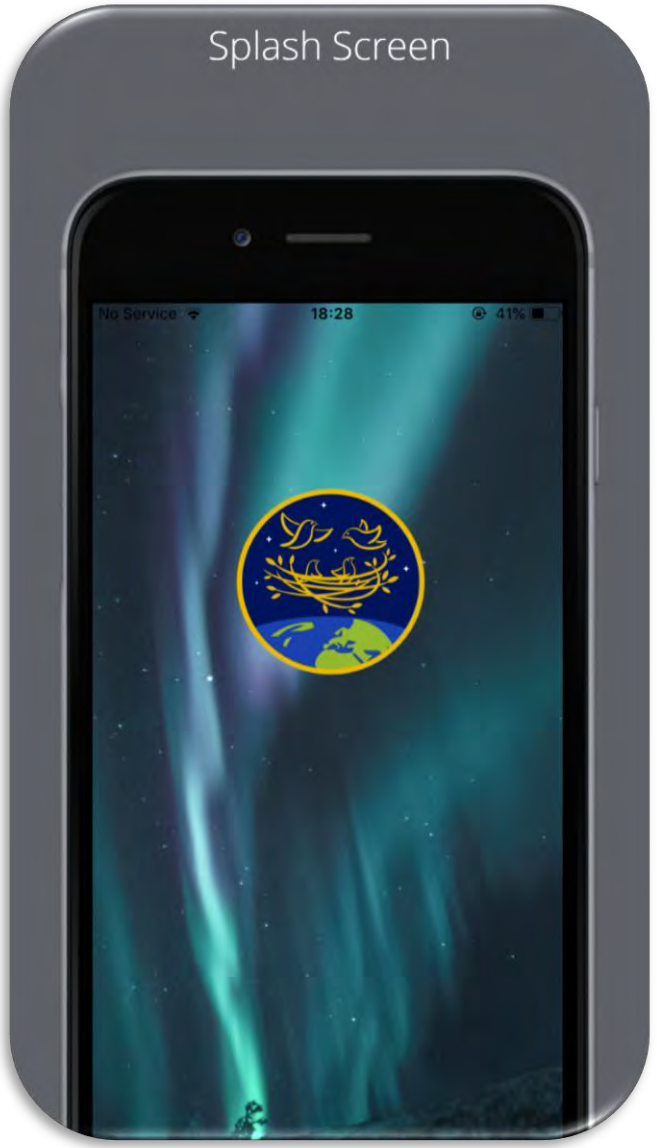
09/11/2020

Introduction

- The BIRDSNEST is a phone application designed for the BIRDS Satellite Project

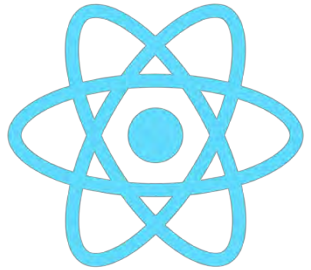
- Its primary purpose is to increase awareness of the space industry while giving users an understanding of the BIRDS project and the results of the team efforts

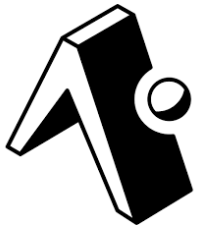
- The phone app can visualize all the BIRDS satellites during its orbits and it presents the collected data in different formats such as texts or images



Software Environment

- Development using React Native Framework:
  - Easy to learn/use
  - Build for IOS/Android/WebApp
  - Helpful documentation/community
- Expo Command-Line-Interface (CLI)
- Software Language – Java and JavaScript





Coding

- Coding is done in the Visual Studio Code IDE

- The figure illustrates the code used for calculating the ground tracks for the satellites

1. First, we use the TLE data to project the orbit lines using the function “GroundTracks”
2. Next, we create an array for the Satellite Coordinates and use loops to create the variables needed
3. We then pass these variables to Google Maps to draw the tracks on the Maps

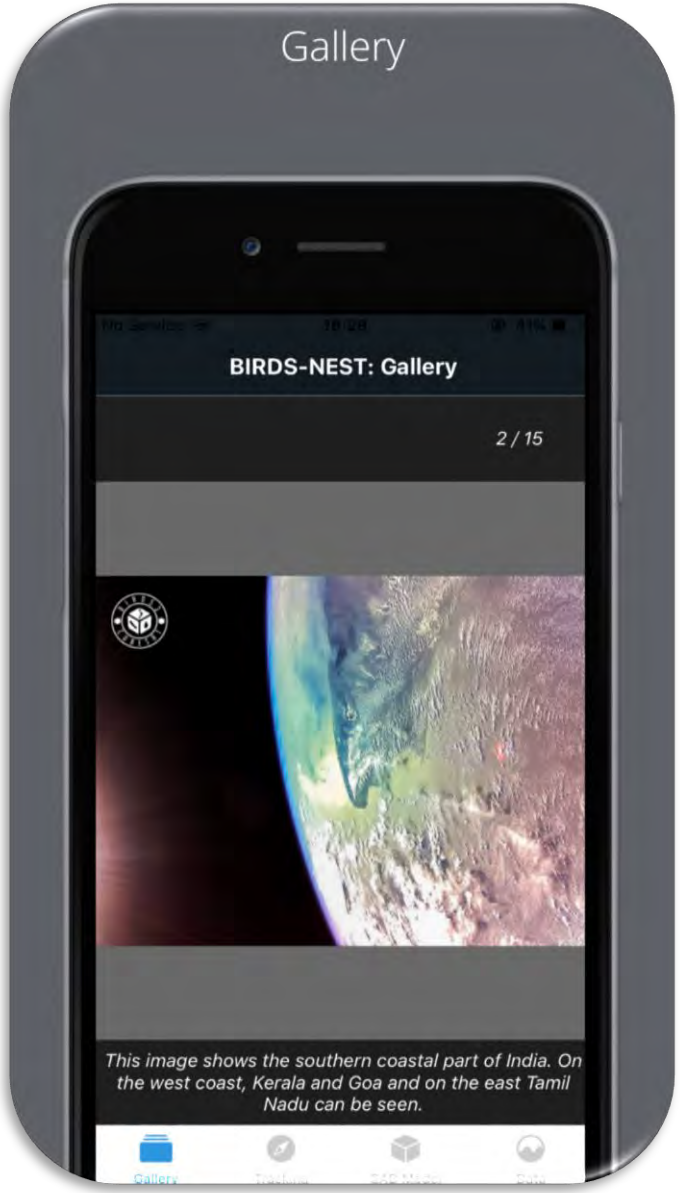
```
_getSatCoords = async () => {

  const orbitLines = await getGroundTracks({
    tle: this.state.TLE_Data,

    // Resolution of plotted points.  Defaults to 1000 (plotting a point once for every second).
    stepMS: 1000,

    // Returns points in [lng, lat] order when true, and [lng, lat] order when false.
    isLngLatFormat: false
  });

  var satCoords = [];
  var satCoords2 = [];
  var satCoords3 = [];
  for (var i = 0; i < orbitLines[0].length; i++) {
    satCoords = [...satCoords, { latitude: orbitLines[0][i][0], longitude: orbitLines[0][i][1] }];
  }
  for (var i = 0; i < orbitLines[1].length; i++) {
    satCoords2 = [...satCoords2, { latitude: orbitLines[1][i][0], longitude: orbitLines[1][i][1] }];
  }
  for (var i = 0; i < orbitLines[2].length; i++) {
    satCoords3 = [...satCoords3, { latitude: orbitLines[2][i][0], longitude: orbitLines[2][i][1] }];
  }

  this.setState({ satCoords });
  this.setState({ satCoords2 });
  this.setState({ satCoords3 });
```

Gallery

- The Gallery Screen allows the user to scroll through the images captured by the satellite during its transit around the earth

- The photos are stored in the Firebase Database where it is called via API request to display in the gallery tab

- As more BIRDS satellites take off, we can obtain more beautiful images to fill our gallery for all to see



Tracking

- The Tracking Screen shows all the satellites in the BIRDS project (BIRDS-3 thus far) on a map. The gold icon is the NEPALISAT-1, the white icon is the RAAVANA-1 and the red icon is UGUISU
- The projected orbit path is also displayed. The light blue line is the previous path, the middle blue line is the current path, and the darker blue line is the future path
- The map can be centered onto the user's location or the satellite via the action buttons on the lower right corner

CAD Model

- The CAD Screen presents a 3D model of the satellites

- This screen allows the user to interact with the rendered version of the design such as: expanding the view, manipulating components, viewing and measuring components, rotating views

Satellite Data

- The Data Screen illustrates the data collected by the satellites in an organized list based on the most recent data transmission

- The data parameters include the battery information, temperature, current range, operation mode etc.

- These screens are intended to give users an understanding of all the components that went into building the satellite, as well as what is necessary to keep the satellite maintained and in normal operating status.

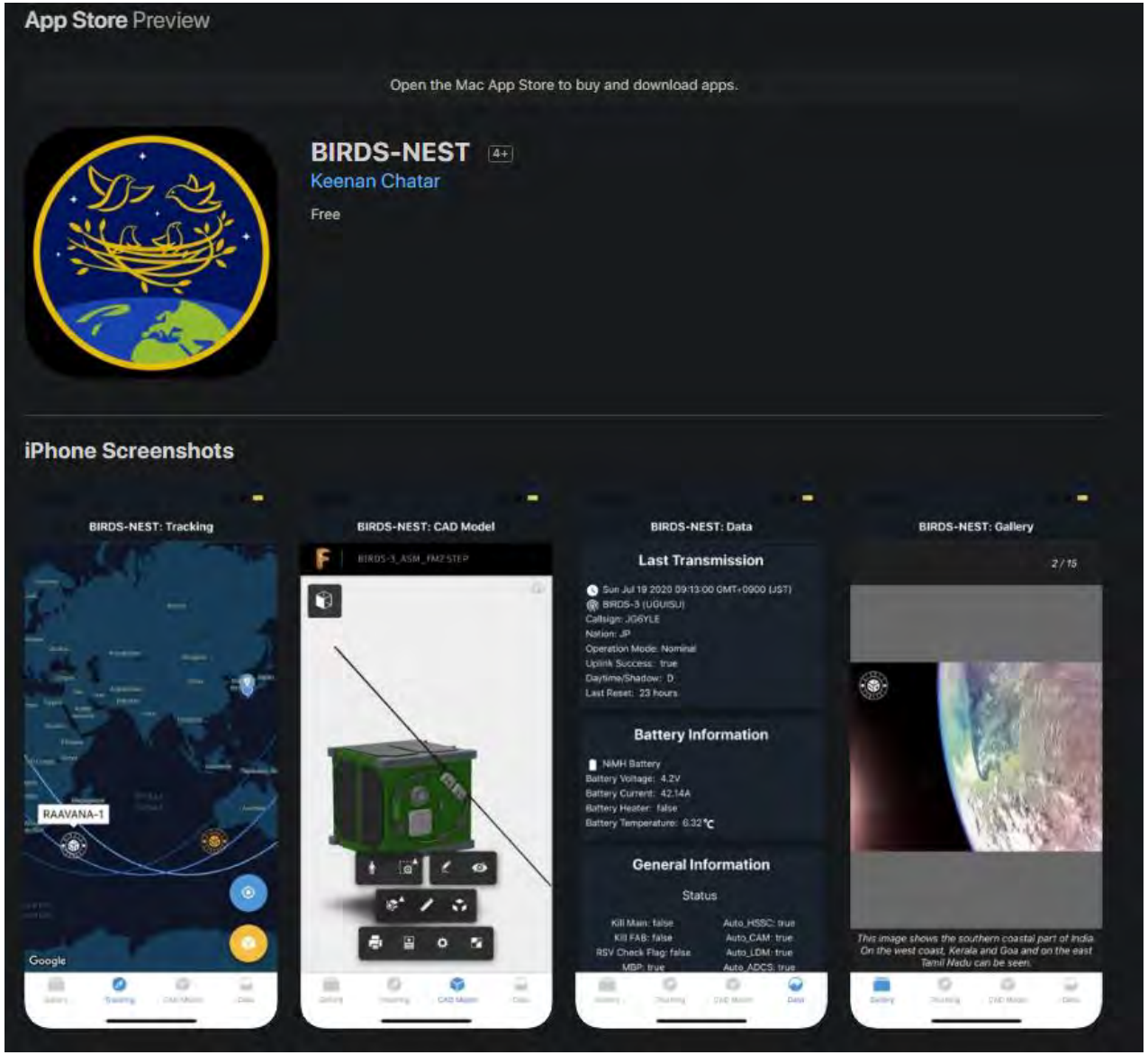
Available on IOS *and* Android!

- The BIRDSNEST app is available for both Android and IOS phones!

- Click either link below or search for “BIRDSNEST” to download now on the Google Play Store or the Apple AppStore for free:

- https://play.google.com/store/apps/details?id=com.kyutech.birdsnestproject

- https://apps.apple.com/us/app/birds-nest/id1535373770



End of this article about BIRDS NEST

UGANDA'S GROUND STATION PLAN FOR BIRDS SATELLITES

By : OMARA Bonny

11/11/2020

AN OVERVIEW OF UGANDA'S NATIONAL SPACE PROGRAM

- The Uganda Government through Ministry of Science Technology and Innovation (MoSTI) has established the National Space Program to enable the country join the league of space-faring countries while exploring and harnessing the numerous opportunities presented by the modern space industry

- The program is structured around developing key pillars that include;

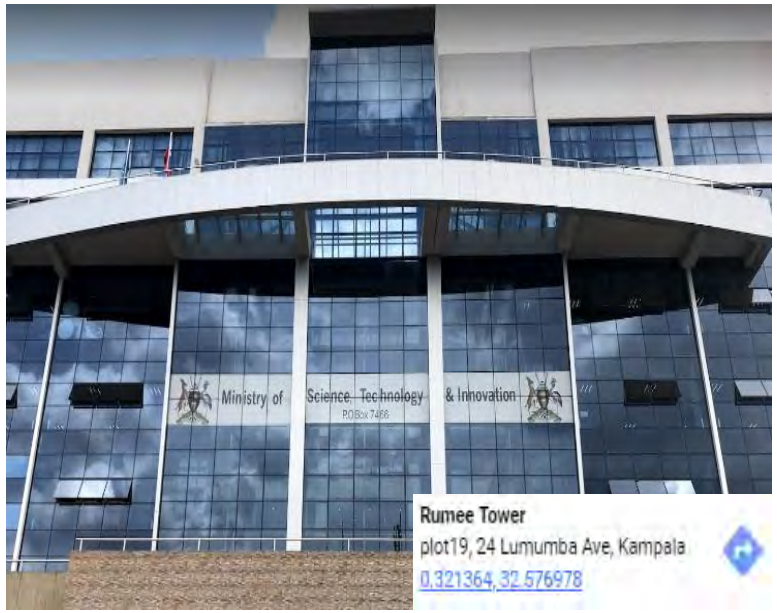
  a) Policy, legal and institutional framework development
  b) Human resource and research capacity development
  c) Space infrastructure (ground and institutional) development
  d) Strengthening collaborations with national, regional and international stakeholders/partners
  e) Space systems, technology and industrial development
  f) Space-enabled products and services (public and private spinoffs/enterprises)

- MoSTI's current collaboration with Kyushu Institute of Technology Japan (KYUTECH) and participation in the BIRDS Project, among others, is directly supporting the effort towards achievement of pillars **a)** to **e)** above.

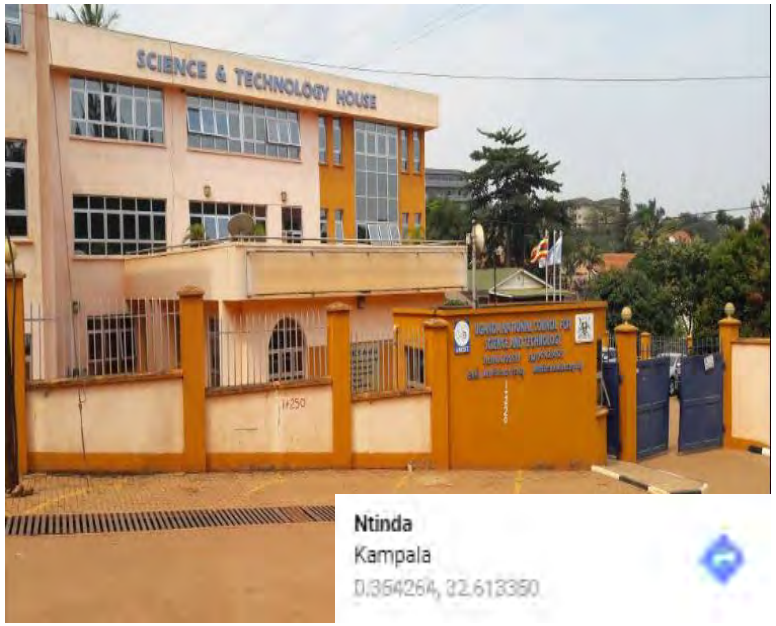
RECENT ACTIVITIES TOWARDS THE DEVELOPMENT OF UGANDA'S SATELLITE STATION INFRASTRUCTURE

- Technical meeting was conducted between KYUTECH and MoSTI on October 1st, 2020.
- MoSTI submitted a Cabinet Paper to the Cabinet of the Republic of Uganda, on the need and proposal to build Uganda's satellite ground station infrastructure.
- Uganda National Space Program development team undertook preliminary site visits to various potential locations to assess factors and inform the plan for locating the proposed Satellite Ground Station infrastructure.
- Over the coming days, a meeting will occur between MoSTI and Zimbabwe National Geospatial and Space Agency (ZINGSA).

POTENTIAL SITES FOR HOSTING UGANDA'S GROUND STATION FOR THE BIRDS SATELLITES



▪Rumee Tower, MoSTI Head Office



▪Science & Technology House, UNCST

▪Communications House, UCC

MoSTI has identified potential roof tops for BIRDS' Ground Station borrowing a leaf from KYUTECH.

EXISTING STOCK OF SATELLITE GROUND INFRASTRUCTURE IN UGANDA

- Uganda's oldest Satellite Communications Ground Station at Mpoma (32-Meter Antenna Diameter), constructed in 1978, by Nippon Electric Co. Ltd., Japan

- The facility that seats on 105-acre land is considered to host key elements of the space infrastructure

As part of the ongoing plans to establish Uganda's Ground Space Infrastructure, an assessment and profiling of the existing space-related ground infrastructure has been ongoing – with a view of understanding challenges and building synergies.

EXISTING STOCK OF SATELLITE GROUND INFRASTRUCTURE IN UGANDA

Radar Station – part of the national weather observation infrastructure stock

The Broadcasting (TV & Radio) Satellite Communication Station in the West Nile Region

As part of the National Space Policy as well as the National Space Program Strategy, it is hoped that these different facilities will be streamlined into one network for potential upgrading and sustainable, effective operations

End of Uganda Ground Station report

DLP = Double Langmuir Probe

DLP Mission

By : Kohei Kamitani
11/11/2020

What is DLP?

DLP is the abbreviation for Double Langmuir Probe.

Double Langmuir Probe

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

Langmuir Probe

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

DLP measures the plasma by applying a voltage between two Langmuir probes and measuring the current from the probes at that time.

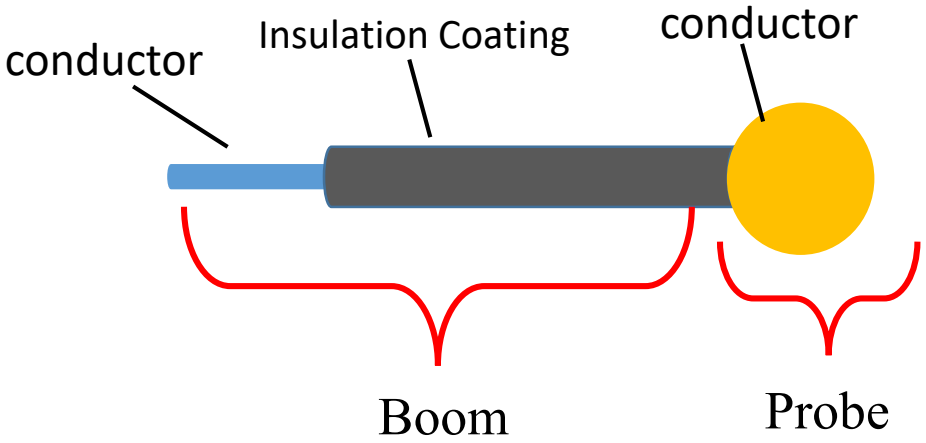


Fig.1 Langmuir Probe

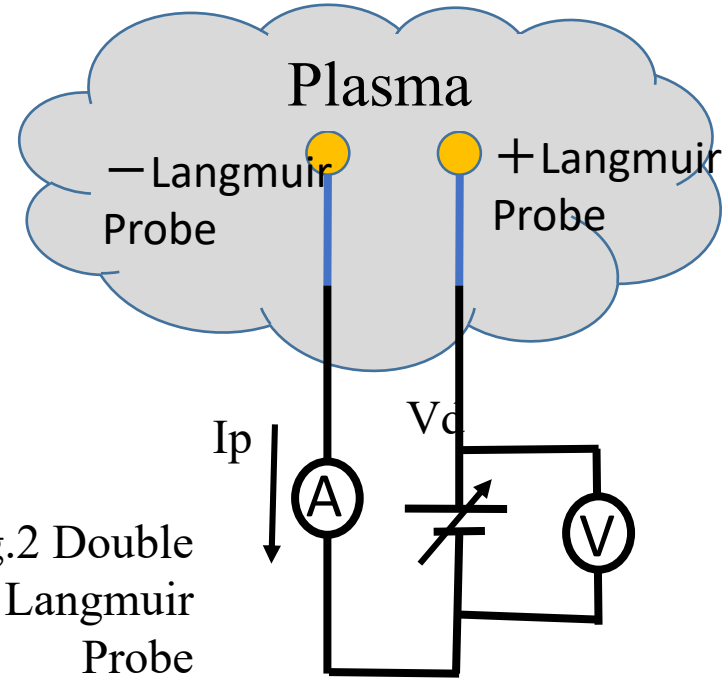
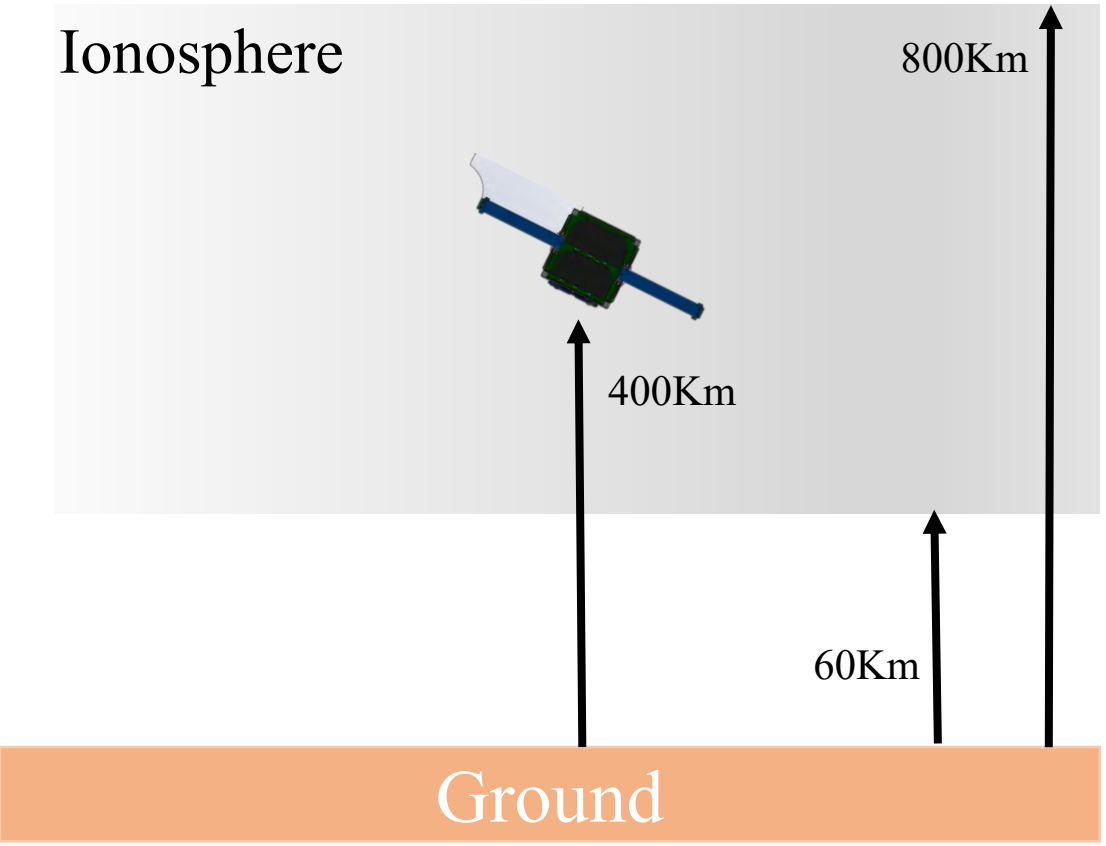


Fig.2 Double Langmuir Probe

Why is it necessary to measure the plasma in space?



There is an ionized area around Earth called the ionosphere, where the atmosphere absorbs ultraviolet light.

It has a variety of effects, including communication failures and damage to the satellite's solar panels.

Thus the importance of monitoring plasma.

Nano satellites are ideal for monitoring the space environment due to their low cost and short development time.

For this reason, the BIRDS-5 project has decided to conduct a plasma measurement mission.

The DLP of BIRDS-5

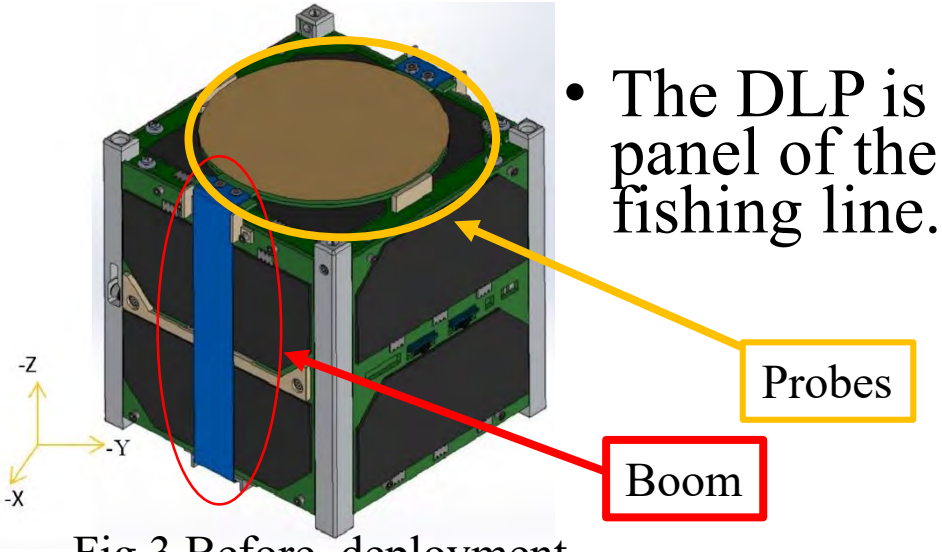


Fig.3 Before deployment

- The DLP is fixed to the -Z panel of the satellite with a fishing line.

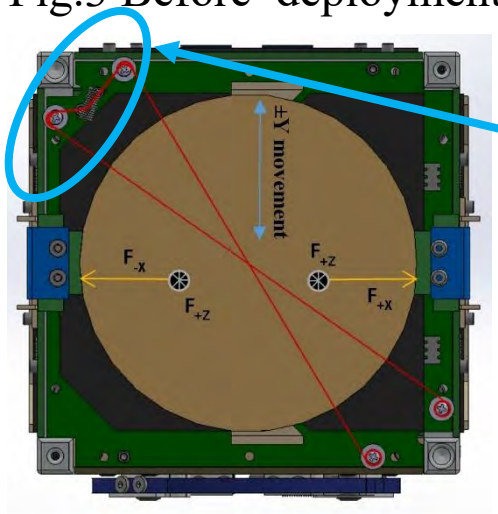


Fig.4 The -Z side before deployment

- A nichrome wire burns the fishing line to deploy the probe for fixation.

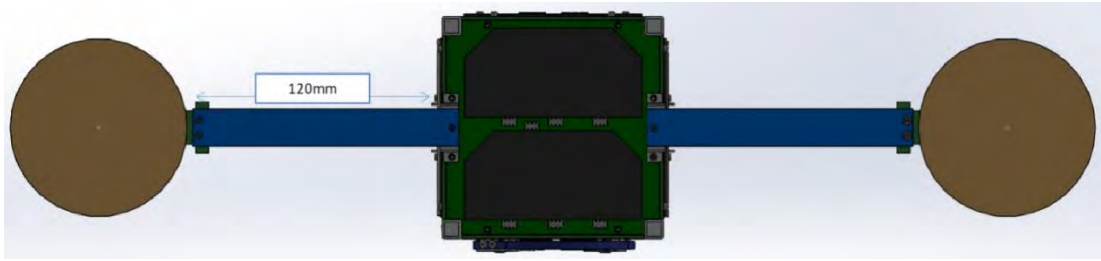
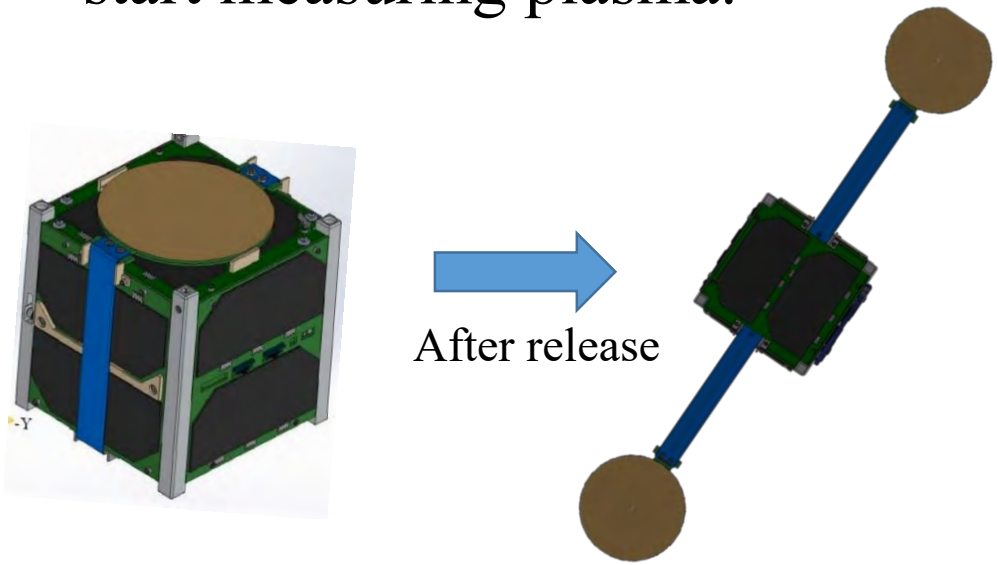


Fig.5 DLP after deployment

- After the satellite release, the Langmuir probe is deployed to start measuring plasma.



End of this DLP article

Our First Days at Kyutech

By: Edgar Mujuni

8th November 2020

- After 15 nights of quarantine at Narita, 26th October 2020 was a day to set off for Kyutech. The smiles on our faces clearly tell the long story.

Ugandan team arrives at Fukuoka Airport after 15 days of Quarantine

The first welcome lunch at "Yappari steak house" at Tobata Station.
Thumbs up Maeda Sensei !

Arrival at Tobata Campus

Upon arrival, the warm welcome from the BIRDS-5 team was a moment both of happiness and the beginning of hard work.

Edgar, Derrick & Bonny
at Kyutech's Main Gate

A photo op with Prof. Cho

The environment inside Cho-lab is none comparable to remote Class.

It is real hard work!

First physical meeting with BIRDS5 members in Cho-lab

A series of BIRDS-5 Get-Together dinners

BIRDS-5 get-together dinner where we ate *Ramen*

Cooking session in the International Dormitory.

In a Japanese Steak house around Kyutech

A special thank you goes to our tutors and friends who kindly guided us around campus.

There is no better interaction between BIRDS-5 members than this. It's always full of fun! We are a great team!

Welcome Halloween Party (31 Oct. 2020)

This auspicious event was coordinated and greatly supported by Maeda Sensei. The Zimbabwe team, led by Victor, welcomed the Ugandan team with a delicious hot meal. Due to Covid19 prevention measures, we were hosted outdoors. *Thank you Victor, Ramson & Timothy!*

Dishes of Zimbabwe and Ukraine

End of this report by the Ugandan Team

End of this **BIRDS Project Newsletter**

(ISSN 2433-8818)

Issue Number Fifty-Eight

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.