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. 63
(26 April 2021)

Edited by:
G. Maeda
革新的宇宙利用実証ラボラトリー
*Laboratory of **L**ea**n** **S**atellite **E**nterprises and **In**-Orbit **E**xperiments* (**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.*

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.

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From Honduras **The Guest Box**

FROM: https://www.hondurastips.hn/tag/copan-ruinas/

Honduras has a lot of tourist destinations that show its amazing natural diversity. However, Copán Ruins is one of the most important and interesting places to visit due to its cultural relevance. Copán was an influential Mayan city, a prominent ceremonial center and one of the main scientific centers of the Classic period, so much so that it was used as an astronomical observatory. Another attraction of the Archaeological Park of Copán is the Museum of Mayan Sculptures, where a large number of Mayan sculptures that have been rescued from the archaeological park are exhibited.

- Reynel, SEIC student in Honduras

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

End of Table of Sections

BIRDS-2S members of the Philippines discuss their experiences of working and studying at Kyutech for Maya-3 and Maya-4 satellites. See Section 11 of this issue.

"Hanami Culture" by a member of BIRDS-5 Team -- see Section 19 of this issue.

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.

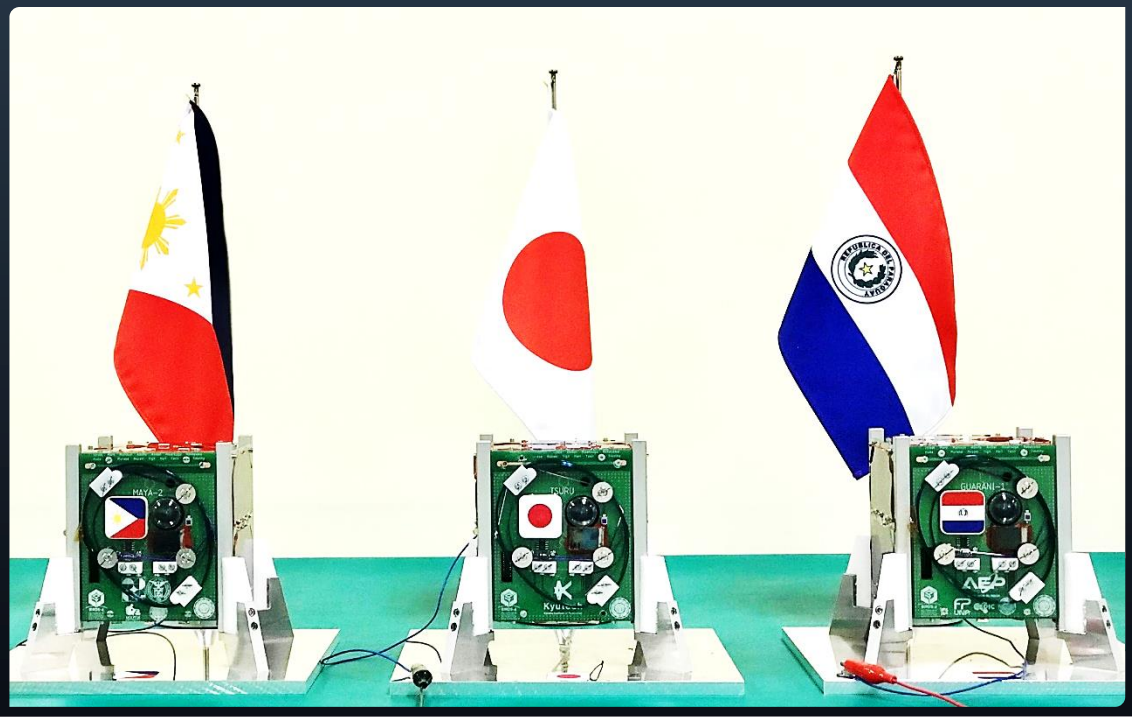
JSPS provides the airfare funds of <u>BIRDS Int'l Workshops</u> and for <u>Ground Station Workshops</u>.

BIRDS-4 Monthly Newsletter

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Table of Contents for ……Issue / 2021

An Update for:
Pages 94-97, Issue No. 53, BIRDS Project Newsletter.
Pages 158-161, Issue No. 54, BIRDS Project Newsletter.



BIRDS-4 Ground Station Activities

Several days ahead to the satellites deployment the team organized members tasks and missions as part of the Pre-Deployment Preparations.

QSL Cards are also designed to be exchanged with the stations that receives satellites signals.

The operation plans of the first pass, first week, first month were carefully design.

On 27th March new UHF antennas are fixed in the roof of the GS building.

The BIRDS Ground Station is now equipped with two VHF/UHF antennas and radios.

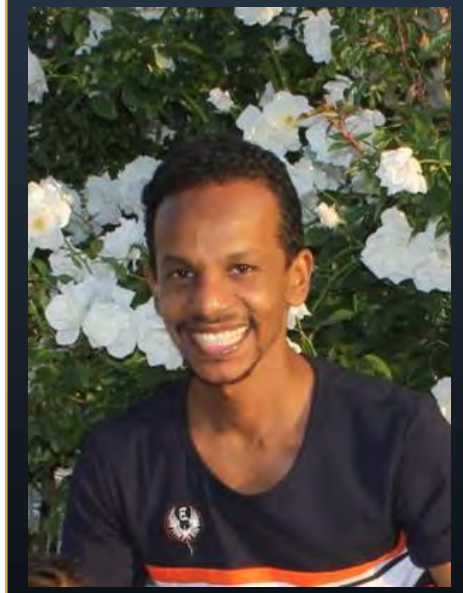
An in-house developed software is used for BIRDS-4 satellites operation. the software controls the radio, the antenna and it tracks the satellites using their position information from the Two-Line Elements files.

The photos show the new and old antenna towers on the roof of the GS building at Tobata Campus, Kyutech.

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by:

Yasir ABBAS



BIRDS-4 Ground Station Activities

On the first day of deployment the CW downlink of the three satellites of BIRDS-4 are confirmed. Philippines and Paraguay Ground Stations participated and received downlink since day one. Also, the amatuer community was very helpful tracking the signals.

During the first two weeks of operation the satellites passes came over Kyutech at night time, thus, the team members had to adjust their active hours and sleeping routine accordingly. The following two weeks, passes time shifted to morning and late afternoon which was more convenient.

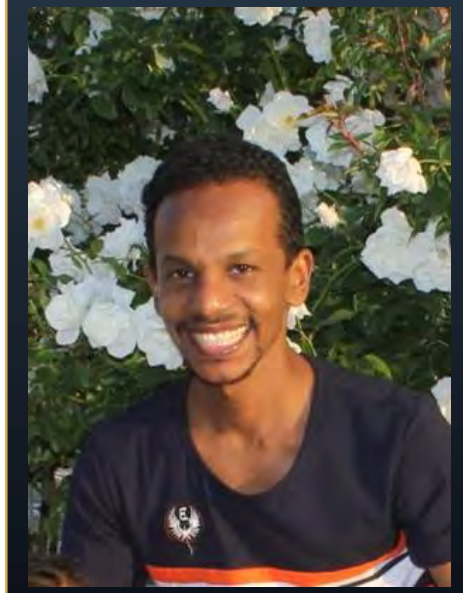
The regular operation activities are:

- To check the satellite housekeeping data.
- To activate missions.
- To download missions data.

This photo shows team members' jubilation after the first successful uplink. (Location: GS operations room on the 8th floor.)

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by:
Yasir ABBAS



02. Mexico’s ambassador to Japan visits Kyutech

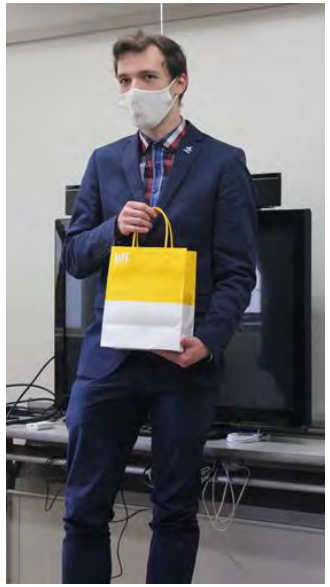
On 22 March 2021, Ms. H.E. Melba Pria (Ambassador of Mexico) visited LaSEINE. The following topics were covered

- Collaboration between Kyutech and universities in Mexico
- Student exchanges
- Ongoing satellite projects that Kyutech has with Mexican entities (e.g., UNAM)

03. Cho Lab graduation event of 25 March 2021

More photos on the next page

Traditional exchange of gifts



04. MEXT-funded report about Japanese university-led capacity building

Full Title of Report

Evaluating Japanese university-led space technology development and utilisation capacity building programmes in emerging countries

新興国における宇宙技術の開発・利用に関する我が国の大学等による人材育成支援活動の評価

DOWNLOAD THE 2-MB REPORT FROM HERE:

https://stig.pp.u-tokyo.ac.jp/?p=4061%20%3Chttps://stig.pp.u-tokyo.ac.jp/?p=4061%3E

The first space policy report of the STIG Program, titled “Evaluating Japanese university-led space technology development and utilisation capacity building programmes in emerging countries”, was published in March 2021. It is the result of two years of research by a team of researchers of The University of Tokyo and Nihon University, on the support provided by universities of advanced space powers to developing countries willing to start domestic space development activities.

Relying on numerous case studies and extensive field visits, this report provides a comprehensive evaluation of selected existing and past capacity building programs, with an emphasis on Japanese universities, before proposing a series of lessons and good practices on the best way to organise a capacity building program, from the perspective of both donors and recipients. It then makes a series of recommendations to the Japanese government to improve its support to domestic universities engaging in capacity building activities.

This research was funded by the Science for REdesigning Science, Technology and Innovation Policy (SciREX) program of the Ministry of Education, Culture, Sports, Science and Technology (MEXT).

Continued on the next page

MEXT-funded Report

Evaluating Japanese university-led space technology development and utilisation capacity building programmes in emerging countries

新興国における宇宙技術の開発・利用に関する我が国の大学等による人材育成支援活動の評価

From Page 5 of this 98-page report →

This report includes a section about Kyutech and the BIRDS Program

Activities conducted for the project and outputs

The approach adopted in this study mostly consisted in collecting as much data as possible from past and current Japanese university-led space technology development and utilisation capacity building programmes, as well as comparable
foreign initiatives. The data was collected through literature review, offline or online
interviews, participation in international conferences and workshops, as well as during field visits of universities, laboratories and private capacity building service providers. Overall, the activities conducted as part of this project were:

- Interviews of Japanese capacity building providers in Tokyo in April-May 2019.
- Interviews of Japanese and foreign capacity building providers and recipients during the International Symposium on Space Technology and Science, in Fukui, Japan, in June 2019.
- Data gathering field trip to the United Kingdom, Italy and the Netherlands to interview capacity building providers in June 2019.
- **Field visit at the Kyushu Institute of Technology to investigate their flagship BIRDS programme in August 2019.**
- Interviews during the International Astronautical Congress in Washington, DC, in October 2019.
- Interviews and a workshop during the Asia-Pacific Regional Space Agency Forum in Nagoya in November 2019.
- Based on the data collected, a lot of analytical work during most of 2020.
- Final workshop to get feedback from experts in January 2021.

Based on this work, we generated the following outputs, mirroring the aforementioned research questions:

1. A precise mapping of Japanese university-led space technology de

05. Highlighting Japan – April 2021 issue

PUBLIC RELATIONS OFFICE
GOVERNMENT OF JAPAN

– THEME FOR April

THE JAPANESE AND CHERRY BLOSSOMS

Cherry trees and their blossoms have been admired by the Japanese since antiquity. More than a hundred cultivars have been bred from the ten wild cherry species to create blossoms of many hues that blanket Japan in the spring. Cherry blossoms have long been eulogized in literature and the arts. Confectionery and other foods are made in the flowers' image and even using the trees' leaves, while there is a unique handicraft that makes use of cherry tree bark. In this month's issue of Highlighting JAPAN, we explore the Japanese love for cherry trees and their blossoms.

PDF(353KB) ← *Use the link below to get this pdf*

April 2021

THE JAPANESE AND CHERRY BLOSSOMS

DOWN LOAD THE APRIL ISSUE:

https://www.gov-online.go.jp/eng/publicity/book/hlj/20210401.html

06. Simulating Starlink “Availability” Over the Philippines

Republic of the Philippines
Office of the President

PhilSA
Philippine Space Agency

A train of Starlink satellites as seen over Japan
Screenshot by Eric Mack/CNET

Ready for Starlink? Are They Ready for You?

A considerable portion of the Philippine population live in remote rural locations classified as geographically isolated and disadvantaged areas (GIDAs) that continue to remain unconnected to the Internet. The lack of mobile cellular networks and fixed wired or wireless Internet services in these areas remains a persistent and serious problem. For people residing in GIDAs, the best alternative they might have for now to be connected online is through satellite-based Internet. In such scenarios, large geostationary (GEO) Internet satellites have traditionally served as a means to deliver Internet services quickly, with only minimal ground infrastructure required to be set up. In recent years, a few groups have been gaining traction in championing the use of small satellite mega-constellations in low Earth orbit (LEO) to deliver broadband Internet, which we shall discuss in this piece.

READ IT: https://philsa.gov.ph/news/a-simulation-of-starlink-satellite-availability-over-the-philippines/

07. Uganda announces a plan to build a ground station

The Uganda cabinet sitting on 22 March 2021 approved the proposal to build a satellite station in Uganda with the main objective of developing Uganda's space capabilities in a well-coordinated and harmonized manner. The following benefits and outcomes have been identified:

- Increased evidence-based technology information for planning and decision making
- Improved space science and technology infrastructure to support research for industrial development for the country
- Improved defence and security through improved capabilities for cross border movement monitoring and surveillance for the country
- Increased private sector investment in space science, technology, research and innovation. This will, in the end, enhance foreign direct investment and collaborations, which will, in turn, attract or spur development for new technologies in the country.
- Improved national earth observation and remote sensing centres for the country
- Improved application of space science and technology to the social, economic, political and environmental needs of the country while ensuring that Uganda also becomes a significant user and player of the outer space
- Increased Human Resource capacity to facilitate the development of space technology in the country.
- In 2019, the Ugandan Minister of Science, Technology, and Innovation announced the country had set aside a budget for capacity development in the area of satellite development, which will see the nation launch its first satellite by 2022. In 2020, the International University of East Africa (IUEA) also submitted an application to the Uganda Communication Commission (UCC) to be able to build and launch an education satellite named Satellite One (IUEA UGA. SAT 1).

Other East African countries that have launched satellite into space are Ethiopia, Kenya and Rwanda.

Source: https://africanews.space/uganda-to-build-a-satellite-station/

08. S-Booster 2021; space-based business idea contest

S-Booster 2021

S-Booster Objectives

S-Booster is a contest for new business ideas utilizing space assets from people who aim to launch new projects in their companies or start new businesses. Support is provided for commercializing finalists' ideas through mentoring by experts, including business advice. S-Booster finalists will present their business ideas to investors, business companies, and others who are interested in the space field at the Final Round. In this way, business matching opportunities will be provided, connecting individuals and companies with ideas to investors and business companies that can help with future commercialization.

Schedule

	Entry Period	Round 1 (document screening)	Round 2 (interview)	Mentoring	Final Round
Japan	Tuesday, March 23 - Thursday, May 20 5:00 p.m. JST	May-June	July	August - December	December 17 (TBD)
Asia-Oceania region	Tuesday, March 23 - Thursday, May 20 5:00 p.m. JST	May-June	July	August - December	

* In principle, Asia/Oceania region entrants will participate online. * Formats and schedules may be changed as necessary.

Prizes

- **Grand Prize** (1) — Prize money 10 million yen
- **Special Judges' Prize** (1) — Prize money 1 million yen
- **Asia-Oceania Prize** (1) — Prize money 1 million yen
- **Sponsor Prize** (5) — Prize money 500,000 yen
- **JAXA Prize** (1) — Six months hand-on support, special feature in JAXA publicity media

Please visit S-Booster website for details.

▶▶▶ https://s-booster.jp/en/2021/

Twitter @sbooster_en Facebook @sbooster.en LinkedIn https://www.linkedin.com/company/s-booster/

Host : National Space Policy Secretariat, Cabinet Office, Government of Japan
Organizer : S-Booster 2021 Executive Committee Contact : S-Booster 2021 Executive Committee Secretariat info@s-booster.jp

S-Booster 2021

内閣府 Cabinet Office

Hosted by the *Cabinet Office of Japan*, and co-hosted by JAXA.

Visit

https://s-booster.jp/en/2021/

09. Kyoto University and Sumitomo Forestry begin project to made a wooden satellite

Starting 3 April 2021, two professors and one student from Kyoto University (Professor Nakayama, Professor Murata, and Mr Sotsuka) came to Kyutech to work on their wood satellite project.

This project receives a lot of media attention – see the next few pages.

BBC Sign in | Home | News | Sport | Reel | Worklife | Tra

NEWS

Home | Coronavirus | Video | World | Asia | UK | Business | Tech | Science | Stories | Entertainment & Arts

Japan developing wooden satellites to cut space junk

By Justin Harper

Business reporter, BBC News; Published 29 December 2020

Japan plans a 2023 launch of the world's first satellite made out of wood.

A Japanese company and Kyoto University have joined forces to develop what they hope will be the world's first satellites made out of wood by 2023.

Sumitomo Forestry said it has started research on tree growth and the use of wood materials in space.

The partnership will begin experimenting with different types of wood in extreme environments on Earth.

Space junk is becoming an increasing problem as more satellites are launched into the atmosphere.

Wooden satellites would burn up without releasing harmful substances into the atmosphere or raining debris on the ground when they plunge back to Earth.

Read the rest here:
https://www.bbc.com/news/business-55463366

The Economist January 16th 2021

Science & technology

Space-age materials

Hardy, non-perennial

Making satellites out of wood

THE SPACE age was built on clever materials. The business ends of rocket engines are composed of Inconel, a family of heat-and-corrosion-resistant nickel-chromium alloys developed in the 1940s. The "gold foil" adorning many satellites is, in fact, a form of insulation made from layers of Kapton and metallised Mylar, a pair of artificial polymers from the 1950s and 1960s. SpaceX's Dragon spacecraft use a heat shield made of phenolic-impregnated carbon to protect astronauts during atmospheric re-entry.

But it is not just humans in lab coats who can come up with whizzy substances. Sumitomo Forestry, a Japanese firm, and Kyoto University are pondering the idea of building satellites out of an advanced, high-performance composite made from cellulose and lignin, a pair of complex polymers which are strong in tension and compression respectively. This material is both cheap and abundant. It is self-assembling and requires only simple chemical inputs. Manufacture can be entirely automated, requiring no human oversight. Translated from chemist-speak, they want to make satellites out of wood.

The research team argue that wood offers two advantages. Unlike metal, seasoned timber is easily penetrated by radio waves. That means communication antennas, sensors and the like could be kept inside the body of the satellite. This, they hope, will simplify construction. The second advantage is that, on atmospheric re-entry, the wooden parts of the satellite should burn up entirely, making disposal cleaner.

The researchers hope to launch a prototype version of what they have dubbed a LignoSat by 2023. Space is both extremely cold and very hot, and can switch quickly between the two as a spacecraft moves from shade into direct sunlight. Processing wood to cope with such extremes will be crucial to success. Sumitomo has said merely that its way of doing this is an "R&D secret".

Sending wood into space is not Sumitomo's only ambition for the material. It hopes that lessons from the satellite project might assist its plan to build the world's tallest wooden skyscraper, in Tokyo. This building, dubbed W350, would celebrate the firm's 350th birthday in 2041, and would, therefore, be 350 metres tall—roughly as high as the Empire State Building without its spire.

From this news magazine:

The Economist

← Both Sumitomo Forestry and Kyoto University are mentioned in this article.

Kyoto University is teaming up with a Japanese forestry company to develop wooden satellites to shoot into orbit by 2023 in an effort to cut down on space junk, the BBC reported on Monday.

Takao Doi, a Kyoto University professor and Japanese astronaut, told the BBC that the advantage of a wooden satellite is that if it were to fall out of orbit and burn up on reentry, it wouldn't release as many harmful particles as metal satellites.

"We are very concerned with the fact that all the satellites which re-enter the Earth's atmosphere burn and create tiny alumina particles which will float in the upper atmosphere for many years," Doi said.

Doi added that "eventually it will affect the environment of the Earth." **see the link below for the rest**

Japan is developing wooden satellites to send into orbit by 2023 to cut down on space junk

Isobel Asher Hamilton Dec 29, 2020, 8:17 PM

https://www.businessinsider.com/japan-developing-wooden-satellites-kyoto-university-2020-12

END OF THIS SECTION

10. Column #2 by Fatima of El Salvador

15 Apr 2021

BPN
Español
-2ª EdiCIÓn-

Fatima Duran

El Salvador

Estudiante SEIC/PNST

BASURA ESPACIAL

¡Bienvenid@s! En esta 2ª edición, quiero compartirles sobre un seminario en el que participé como ponente con el tema "**Basura espacial: Estado, Riesgos e Iniciativas de mitigación**". El seminario está dirigido especialmente para estudiantes de pregrado en Ingeniería Espacial en Kyutech, y se titula **"SEIC Space Engineering Seminar**".

Fig.1 "Basura espacial". Fuente: *iStockphoto*

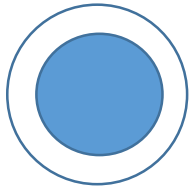
¿Qué es la basura espacial o desechos espaciales?

Es cualquier objeto en la órbita terrestre que ya no cumple una función útil. Según la NASA, estos desechos tienen un impacto significativo en las naves espaciales operativas, ya que estas pequeñas partículas de desechos no se pueden detectar y rastrear fácilmente en la Tierra. Según UNOOSA/ESA, hay aproximadamente **26,000 desechos espaciales monitoreados desde la Tierra y ¡muchos más sin monitorear!**

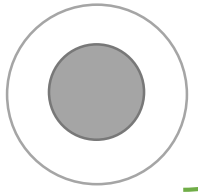
$\approx$ **1950** Etapas de lanzaderas descartadas

$\approx$ **2850** Satélites inoperativos

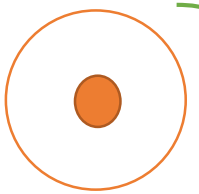
$\approx$ **21,000** objetos y fragmentos de escombros no identificados



$\approx$ **34,000** Fragmentos no monitoreados (>10 cm)



$\approx$ **900,000** Fragmentos no monitoreados (1 - 10 cm)

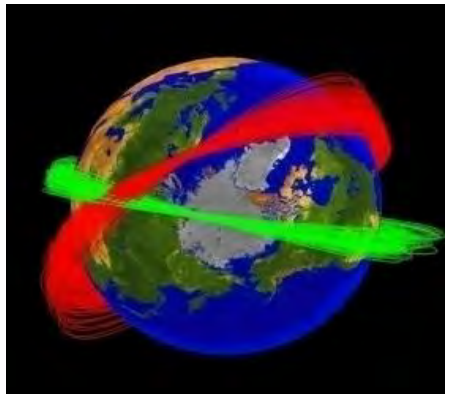


$\approx$ **128 *millones*** Fragmentos no monitoreados (1mm - 10 cm)

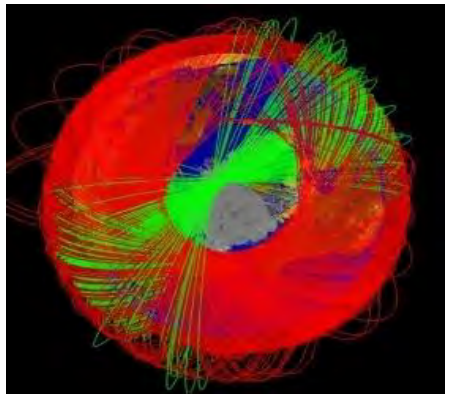
TIPOS DE BASURA ESPACIAL

❑ Colisiones

La basura espacial se debe a muchos motivos. Uno de ellos son las colisiones tanto accidentales como intencionales. La **colisión orbital más importante** entre dos satélites ocurrió en 2009, entre un satélite de comunicaciones estadounidense de propiedad privada, **Iridium-33**, y un satélite militar ruso inoperativo, **Cosmos-2251**. Ambos satélites fueron destruidos produciendo más de **2,300** fragmentos rastreables y muchos más sin poder monitorear.



(a)



(b)

Fig. 2. Distribución de fragmentos por la collision entre Iridium-33 y Cosmos-2251: a) 30 días después; b) 1 año después. Fuente: NASA

Si no se controla la cantidad de basura espacial en los próximos años, ésta representará un **alto riesgo para la seguridad y el éxito de futuras misiones**, especialmente, para los vuelos espaciales tripulados y las naves espaciales equipadas con brazos robóticos.

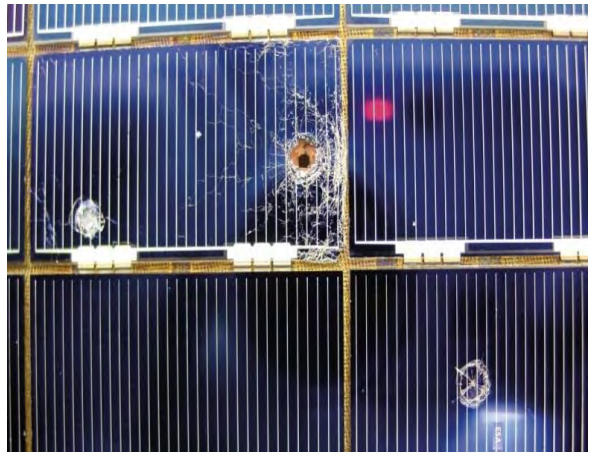


Fig. 3. Daños a paneles solares del telescopio Hubble in 2002. Fuente: ESA

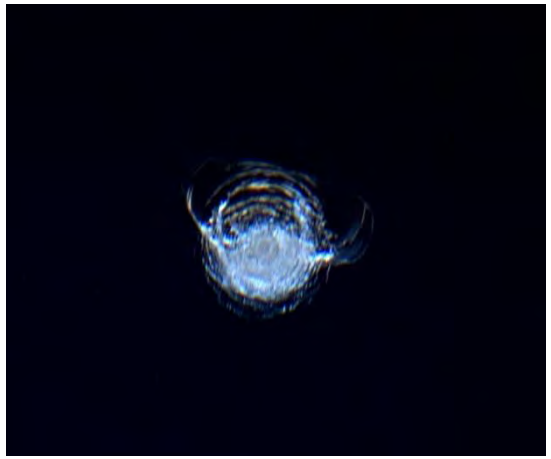


Fig. 4. “Chip de impacto” en la Cúpula de la Estación Espacial Internacional. Fuente: ESA

INICIATIVAS DE MITIGACIÓN

Actualmente, hay diferentes iniciativas que tienen por objetivo ayudar a reducir y controlar el problema de la basura espacial. Entre ellas destacan el programa **ClearSpace-1** de la Agencia Espacial Europea, **ELSA-d** de la compañía japonesa Astroscale, y el projecto **E.T. Pack** dirigido por la Universidad Carlos III, en Madrid. Para conocer más sobre cada projecto, haz click en cada imagen.

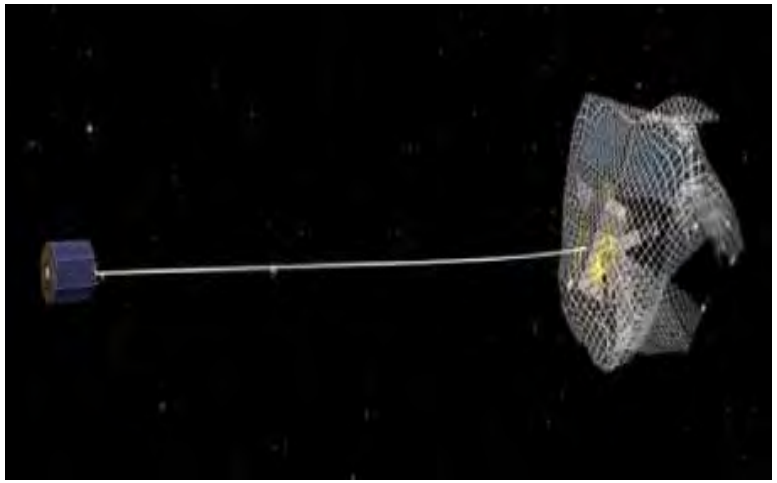


Fig. 5. Misión ClearSpace-1, e.Deorbit. Fuente: ESA

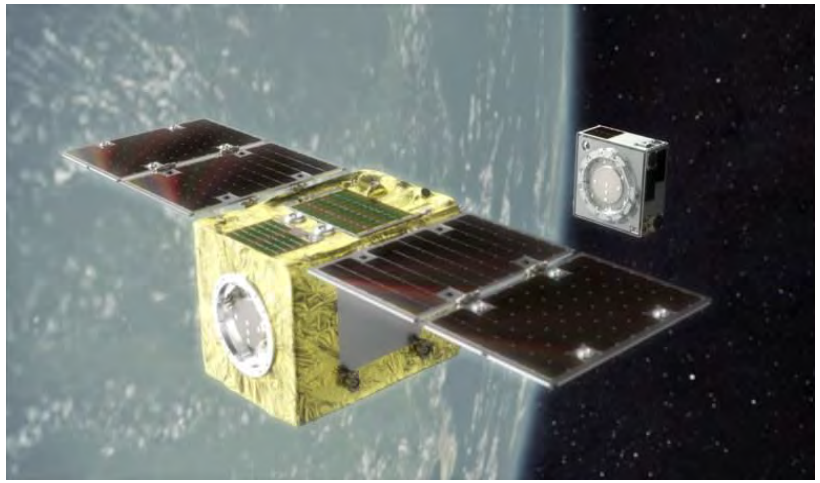


Fig. 6. Concepto de operaciones de ELSA-d. Fuente: Astroscale.

Fig. 7. Concepto de operaciones del proyecto E.T. Pack. Fuente: https://etpack.eu

11. Short essays by the members of the BIRDS-2S Team; they tested their satellites at Kyutech with the help of BIRDS-4 members

On the following pages, check out the diverse comments of the BIRDS-2S team of the Philippines. They arrived back in December to test their two BIRDS-2S satellites, Maya-3 and Maya-4. They are now back in the Philippines.

20. The BIRDS-2S team of the Philippines come to Kyutech for environmental testing of their satellites, Maya-3 and Maya-4

Pages 61-67

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by
- Marloun Sejera
- Mark Angelo Purio
- Izrael Bautista

[The Philippine members of the BIRDS-4 Project]

Above: **21 December 2020, morning; in front of Nakamura Hall; BIRDS-2S members who just arrived from two weeks of quarantine in Tokyo.**

Above: **Read the whole story of BIRDS-2S environmental testing: Pages 61-67, Issue No. 60, BIRDS Project Newsletter**

BIRDS-2S Member Project Experience

I once shared before that I dreamed about being able to build a satellite when I was part of the then PHL-Microsat Program, now STAMINA4Space Program. The program and its people made me fully appreciate the beauty of my field. So, when I was asked to build Maya-3 and Maya-4, I grabbed the opportunity.

Thinking about it, I guess the close-knit relationship that I have with the people behind the development of Maya-3 and Maya-4 is one of the things that come into my mind when asked about my project experience.

Let me tell you a story. As I was setting up the ground station during our Thermal Vacuum Test in Kyutech, Japan, I was able to gaze at how the team was working - others are setting up the satellite inside the chamber, some are checking the thermocouples, the other taking pictures, while some are assisting the leads. The individuals' diverse skills, weaknesses, strengths, and habits came into play for the success of the testing. Then it came to me, we've really come a long way. We've encountered a lot of setbacks along the way, but everyone chose to keep going. The team's ability to perform as an individual and together is key to overcome the technical challenges. Moreover, the friendship made us more supportive of one another.

To add, being the assistant project manager honed me a broad set of skills. Not only that it helped me grow my understanding of the different concepts in nanosatellite development and operation but it also helped me develop trust with the members and nudge them to meet the project goal. And I must say, one of the best parts of working with the team is giving each other a pat on the back for a job well done.

I am really proud and thankful of the people behind the project - team members, mentors both in the Philippines and Japan, project admin, university, and the government, all working together to harness the benefits of space technology for the Filipinos.

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by:

Gladys A. Bajaro

BIRDS-2S Member Project Experience

Making a thing that will soon be flown into outer space is truly something to be excited of. Since I was a kid, I have been fascinated by science and technology. Being part of the first batch of scholars who will develop the Maya-3 and Maya-4 CubeSats has been a once-in-a-lifetime experience. You know that the long hours of work and all nighters pay off when you see that the product functions in space as intended.

My experience, of course, was not without challenges. Early in the program, some delays were encountered due to uncontrolled events (such as procurement) but once resolved, development was made full on. With the cooperation of the entire team and collaborating with different projects, step-by-step, the CubeSats were realized to completion.

Another major challenge in the development of the CubeSats is the pandemic situation in the Philippines. With long stretches of community quarantine in effect, access to the laboratory was greatly limited. This, however, did not stop the team from thinking of ways in making progress. A remote tabletop setup was made (thanks to Judiel) to test our code and subsystems while at home. Moreover, with huge thanks to the help of the BIRDS-4 Philippine team, space environment testing of the engineering model was successfully pulled off during the quarantine. When the team finally had the chance of visiting Japan last December, hands-on testing of the satellites provided us lessons and attract not only the students and practitioners, but also the businesses to delve into the benefits of space science. Lastly, for my message: "I hope that there will be more investments on education and scholarships for people who can see the bigger picture behind these works, and have the capability to realize them".

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by:

Derick B. Canceran

BIRDS-2S Member Project Experience

Article by:

Bryan R. Custodio

It is amazing how, despite the pandemic, the BIRDS-2S team was able to get through all the odds for the sake of giving birth to Maya-3 and 4. This was not possible without the all out support from the STAMINA4SPACE program, UPD, Kyutech, and DOST.

It is of big privilege to be chosen as one of the developers of Maya-3 and 4. You get to learn and apply principles and theories to real engineering problems. It was very delightful to see your works from paper and working models being translated to a working hardware. From mission planning, initial hardware design, interfacing, to functional tests, launch and space environment tests, to final integration. All tasks entail scientific method to make sound engineering decisions leading to the satisfaction of mission requirements.

It is an honor to have the opportunity to work on the first University-built cubesatellite, with people having diverse backgrounds and skills. Much like a satellite system, a group is built up of completely unrelated people, synergizing, to achieve their ultimate mission. The disconnected components, the interfacing, testings, troubleshooting, and final integration to build a satellite, I think, is very much similar to the experiences that built up the team flourishing as one.

This is just the starting point of the space education program here in the Philippines. With the establishment of the Philippine Space Agency (PhiLSA), I believe that it would each other out and being creative shine through.

The journey is just as important as the destination. The CubeSats may seem small, but the experiences and lessons gained will be a great help in progressing science and technology in the Philippines.

BIRDS-2S Member Project Experience

I had an amazing journey in Japan! The sandwich program for satellite testing, training, and workshop in Fukuoka, Japan was so memorable. This program would not be possible without the help of the STAMINA4SPACE, UPD, Kyutech, and DOST. I've learned a lot from Space Environment Testing, the Japanese cultures, and even about their foods.

Traveling amidst this pandemic is so difficult. So, traveling in Japan was a mix of excitement and worry at the start. The feeling had changed eventually when we arrived in Kitakyushu where I enjoyed the scenery, the weather, and the people. And even though I can't speak Japanese, traveling in Japan was adaptable and enjoyable with the help of my fellow Filipinos.

As the responsible person for the On-Board Computer (OBC) subsystem or the "brain" of the cube satellites, my responsibility during the satellite testings (flight model) was to ensure that the satellites will execute all the expected functions such as sending the CW beacons (telemetry data), executing the different uplink commands sent by the ground station, ensuring the satellite health, and handling communication between subsystems.

To be part of the eight Filipinos who developed the Maya 3 & 4 will always be a great honor, an opportunity, and a responsibility. And as a mother, it's quite tough to balance my time but what I'm doing right now is part of ensuring this sustainable and better future for the younger generation.

My goals are to improve their mindsets, focus on bringing satellite development skills to Maguindanaons and to enlighten them that space-related dreams are not only for the mighty and rich but also for the poor which are deserving and determined.

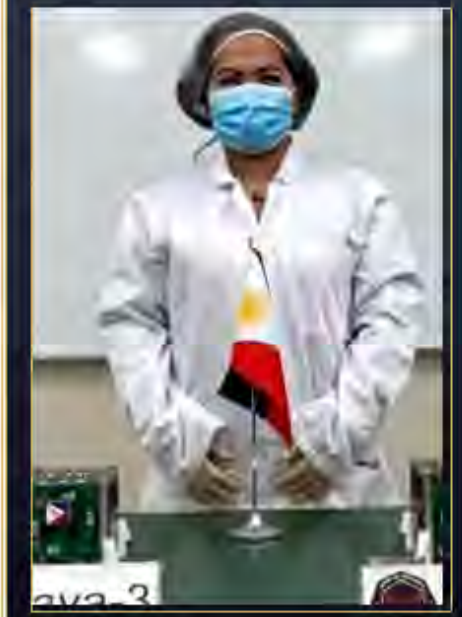
For the younger generations who are aiming to follow the trail we started, always keep in mind that intelligence will work best if we have better character.''Continue working on it''. Be hardworking, be determined, and focus on what you're aiming for.

BIRDS-4

Joint Global Multi-Nation Birds Satellite Project

Article by:

Lorilyn P. Daquioag



BIRDS-2S Member Project Experience

It was quite unexpected to become part of the first batch to develop the first in-country cube satellites. Knowing that I am far beyond the skills and knowledge of my other team mates, I worked double time to step with them in this adventure of learning the principles on space science and technology.

A great opportunity to be in this project, I am honored and excited to learn the basics of satellite development, the science behind it, and the vast applications it could provide for the people to live and work better and know more what's on earth and what's beyond the universe. I am also glad to be in this field meeting a new variety of professionals working towards the advancement of space science and technology in our country.

The most unforgettable part of the project was the hands-on conduct of space environment tests (Acceptance Tests) of Maya-3 and Maya-4 in LaSEINE, Kyutech. Aside from the fact that it was a dream come true having experience to travel in Japan, I was also privileged to see the facilities used for the environment tests of cubesatellites, learning how they work, and performing the environment tests of the satellites we were studying since design phase until the flight model phase. It was a priceless experience despite the sleepless nights and the worries of getting sick due to COVID-19 during the conduct of the satellite tests and assemblies in LaSEINE.

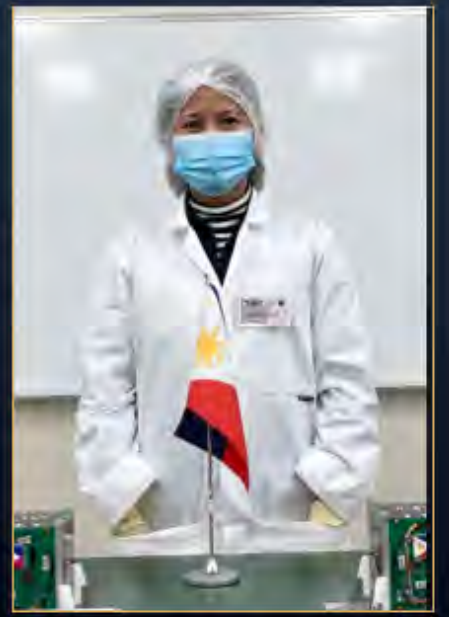
I am truly thankful for the enthusiastic and supportive members and staff of the STeP-UP, the STAMINA4Space, UPD, DOST, the Kyushu Institute of Technology team, and the members of BIRDS project in Japan and in the Philippines for the support, mentoring and hands-on assistance on the space environment tests of Maya-3 and Maya-4. The pandemic made our experience more challenging, yet, I was glad that my teammates were positive and supportive for when one is slowing down for some reasons, others fill-in to motivate each other to still look forward and finish what we had started.

After this program, I am looking forward to still learning more about satellite development and apply them in my future work assignment.

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by:

Marielle Magbanua-Gregorio



BIRDS-2S Member Project Experience

The recently concluded Space Environment Tests for Maya-3 and Maya-4 cube satellites in LaSEINE, Kyutech was an experience full of learnings and remarkable memories. It was an opportunity to learn first-hand from the experts behind the successful BIRDS Project, and experience the actual satellite testing processes. It complemented the knowledge and skills we acquired during classroom instruction and local training, experiment and individual system tests, and mentorship of project leaders, seniors, and colleagues.

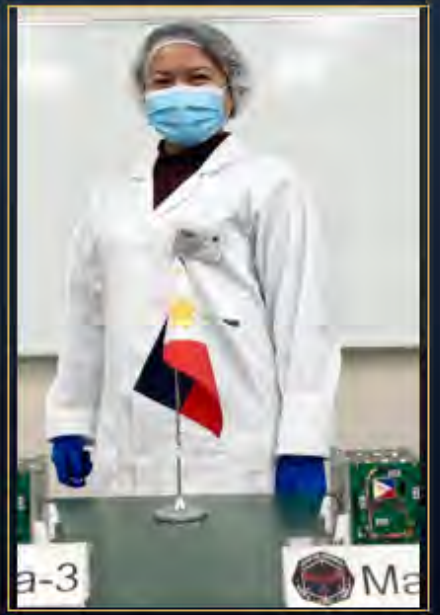
The journey was a mixture of difficulties and excitement. The professors and staff of LaSEINE, the entire BIRDS family aboard Kyutech, have taught and guided us in each step towards our objectives, they have accommodated and promptly responded to our queries and requests from satellite model test preparation, operating the facility equipment, up to test results documentation. There may be a handful of difficulties that we encountered during the tests as everything was our firsts, even so, we were also accompanied and backed up by Filipino members of BIRDS-4 in Kyutech since day one in satellite development and test stages. Hardware issues, software bugs, and more unexpected errors added the thrill, yet, these were all managed and addressed on time. With this, a brand-new set of knowledge and skills were gained from that day-to-day experience that surely will help us grow personally and professionally, bring it on to the next levels, and share it with aspiring individuals.

It was a privilege to become a part of this (another) significant leap of the Philippines towards space technology. Thus, I am extending our utmost appreciation and sincere gratitude to DOST, UP-Diliman, STAMIN4Space, and Kyushu Institute of Technology – grateful for the continuous support to the project.

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by:

Christy A. Raterta



BIRDS-2S Member Project Experience

Science and technology have always given me excitement as an engineer. And now that I am in the field of space technology and development which is a developing path in our country, pure knowledge will not be enough to equip and prepare us for this, it should always be paired with actual technical works and mentoring. I experienced all of this during our stay at the Kyushu Institute of Technology to conduct the space environment test for the satellites that we were developing. I came to see and interact firsthand with the people behind the BIRDS Satellite Project, the mentors, and the other project members from different participating countries, as we were only hearing about them when we were at the university back home. I learned not only how to operate the testing equipment and perform the tests but also the ways on how people do and work inside their laboratories. Mentoring and the guidance of the different people we encountered really helped us during our stay as they were able to share different experiences, techniques, and the troubles that can be avoided while testing. Having our fellow Filipino engineers there was a massive help to us as they served as our big brothers and teachers as we were new to the environment and the facilities. They welcomed and helped us in all ways possible. We were guided along the way as we explored the different facilities, equipment, and met different people. As we encountered various challenges while doing the tests and other activities, with the amazing people around us, it was with confidence that we will get solutions and answers, and if it is not readily available, help will be just within a reach of a hand. With our main goal as to why we went to Kyutech, which is to gain technical knowledge, test, and finalize our satellite for launching, we also get a good takeaway from the experience which inspired us to do more as we proved to ourselves that we did it.

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by:

Judiel L. Reyes

BIRDS-2S Member Project Experience

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by:

Renzo S. Wee

An unforgettable roller coaster ride, as cliche it sounds, this is how I would describe my experience in developing Maya-3 and Maya-4. This once in a lifetime experience of making the first locally and Philippine-university built satellite shook me to the bones.

Looking back, the past couple of years implanted in me lessons that I will carry with me for the rest of my life. It honed my skills in decision making. It taught me how to go above and beyond if I want to achieve my goals. If anyone would ask me anything about satellite development a few years ago, I would be laughing because I would think that they were joking. But if they asked me now, although I still would not be confident enough for I know I only scratched the surface, but also, I could go on and on and on talking about how to build a satellite.

This project also gifted me with friends that I will cherish and fight with for many years to come. Mentors that I will surely seek deeper learnings and advice. Acquaintances that I can network with.

Well of course, it wasn't always sunny in Philadelphia. Failures, , difficult and challenging days taught me to weather the storm and be resilient to rise above it.

As I write this, floods of memories of laughters and tears started rushing in. Truly, an unforgettable roller coaster ride.

12. Report from the Philippines

UPDATES FROM THE PHILIPPINES

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

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Diwata-1 Anniversary **March 23, 2016** / April 6, 2021

The Philippines' first microsatellite, Diwata-1, was launched to the International Space Station (ISS) aboard an Atlas V rocket. March 23, 2021 marks the fifth year since the satellite left Cape Canaveral, Florida, and was brought a step closer to its eventual space environment. It was decommissioned on April 6, 2020, having spent nearly 4 years in space - exceeding its initially projected lifespan of 18 months.

It was built by Filipino scientists and engineers of the Development of Philippine Scientific Earth Observation Microsatellite (PHL-Microsat) Program (now STAMINA4Space) who were sent to study and train in Tohoku University and Hokkaido University in Japan through DOST-Philippines and UP Diliman.

See Diwata-1's journey here:
https://stamina4space.upd.edu.ph/diwata-1/

Photo courtesy of UNISEC Philippines

UNISEC PH New Member

March 22, 2021

We would like to welcome the Bataan Peninsula State University (BPSU) to the University Space Engineering Consortium (UNISEC) Philippines!

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

BPSU is the 11th academic institute to join the Philippine chapter of the UNISEC, which is managed by the Space Science and Technology Proliferation through University Partnerships (STeP-UP) Project of STAMINA4Space.

Member universities gain access to information and knowledge exchange, capacity building, and other educational tools and resources related to space science, technology, and engineering.

Know more about UNISEC-Global: http://www.unisec-global.org/

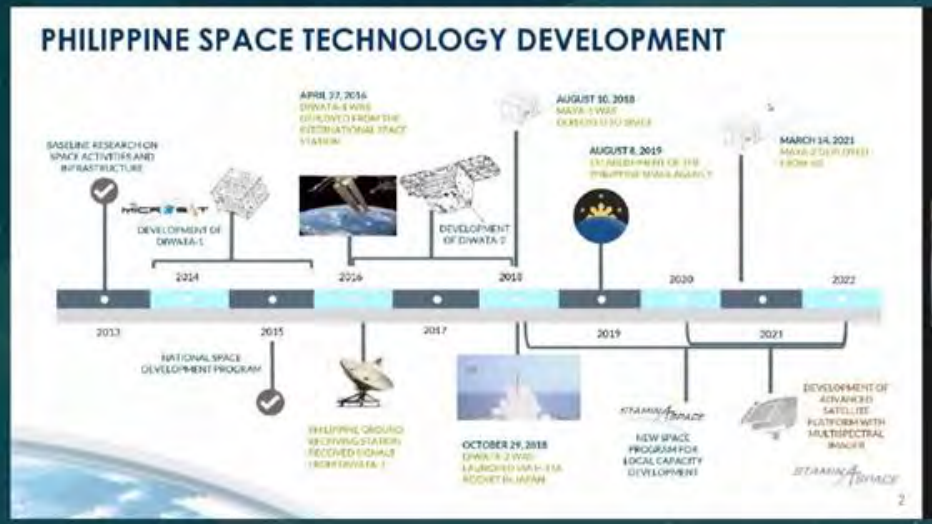
Photo: Captured from CNN Philippines live stream

International Women's Month

March 18, 2021

In celebration of International Women's Month, one of our research engineers, Mary Ann Constante, was invited by CNN Philippines to talk about her role in the STAMINA4Space Program and the importance of women in the field of space science and technology.

Watch her interview here:
www.youtube.com/watch?v=8MJqMxMqYQ0



International Women's Month

March 29, 2021

In celebration of International Women's Month, the Department of Foreign Affairs' Office of United Nations and International Organizations, in coordination with the Philippine Permanent Mission to the United Nations in Vienna, the Foreign Service Institute, the Department of Science and Technology, the Philippine Space Agency, the Department of Education and the Commission on Higher Education, organized a webinar on "Making Space for Women: Advancing Gender Equality in the Philippine Space Science Sector" on March 29, 2021.

STAMINA4Space Program Leader Dr. Maricor Soriano was one of the speakers. The webinar discussed the advancement in gender equality in space and in science, technology, engineering, and mathematics (STEM).

International Women's Month

March 29, 2021

Dr. Maricor Soriano was also featured by the College of Science of the University of the Philippines Diliman (UPD) for their International Women's Month Celebration. She gave insights on her experiences as a female physicist who works with different scientific and artistic fields.

Check out the full story here: shorturl.at/IAT45

Photos courtesy of UPD College of Science

Ateneo de Cebu - Sacred Heart School STEM DAYS Webinar

March 17, 2021

STAMINA4Space researcher Arvin Ng presented at the Ateneo de Cebu's STEM Days webinar series under the mechanical engineering category. The students learned about the learnings and challenges that came with working on the Diwata projects, as well as the many different pathways in mechanical engineering that students can pursue.


STAMINA4SPACE
WHAT WOULD
YOU GIVE UP FOR AN
HOUR
EVERYDAY TO HELP HEAL
EARTH?
#EARTHHOUR2021
MARCH 27, 2021
8:30 TO 9:30 PM PHT
STAMINA4Space joins
Earth Hour 2021
March 27, 2021


STAMINA SPACE
PHL MICROSAT
Updates from
STEP-UP
scholars
"The 18th step..."
April 2021
University of the Philippines- Diliman
Quezon City, Philippines
Prepared by STeP-UP scholars
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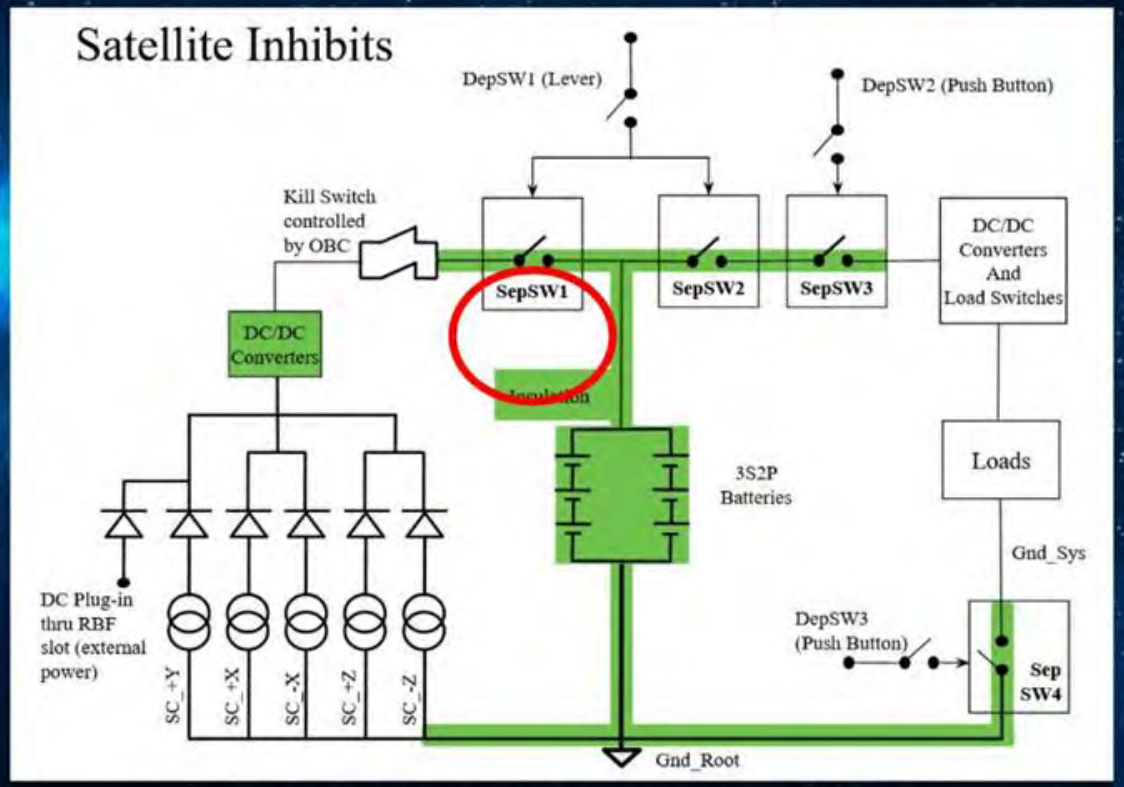
Inspection of the Separation Switch for Battery Charging of Maya-3 and Maya-4

Marielle Magbanua-Gregorio



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

The Inspection of SepSW1 for both Maya-3 and Maya-4 followed the test pattern shown in this table

Table 1. Inspection Pattern

Pattern	1	2	3	4
RBF (DC Jack)	○	○	●	●
DepSW1 (lever)	○	×	○	×
DepSW2 (pushbutton)	○	○	○	○
DepSW3 (pushbutton)	○	○	○	○
Satellite state	OFF	OFF	OFF	OFF
SepSW1	OFF	OFF	OFF	ON
Battery state	Not Charging	Not charging	Not Charging	Charging

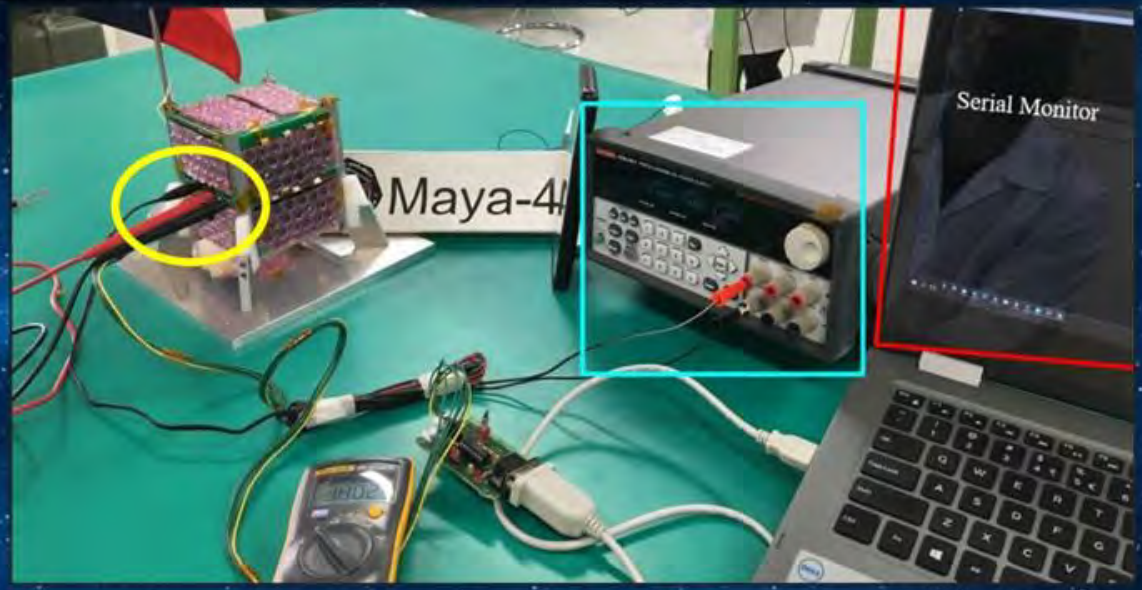
Legend:
○ : pressed/inserted without power supply
× : released
● : inserted with power supply

The Inhibit Function Test (Inspection) specifically for Separation Switch 1 (SepSW1) of the satellites was conducted on March 5, 2021 at LaSEINE in Kyutech in compliance with JAXA requirements. The test was done to validate that the SepSW1 of both Maya-3 and Maya-4 are functional as inhibit to accidental charging of the battery prior and/or during launching operation and prior to release to orbit from the ISS.

Part of JAXA Safety Review for CubeSats

Inspection of the Separation Switch for Battery Charging of Maya-3 and Maya-4

Setup of the Post-VT Inhibit Function Test of Maya-3 and Maya-4 Separation Switches 1



When the RBF port is supplied with power and the Lever switch is released while the pushbutton deployment switches are pressed, the satellite should stay in OFF-state but battery is charging via the RBF port. An increase of voltage reading using the digital multimeter (DMM) and an indicator of current consumption at the external power supply instrument should be observed upon activation of the power supply connected to the RBF port of the satellite. These observations mean that the SepSW1 is properly functioning as a switch that inhibits the battery from accidental charging (during launching or while inside JSSOD) that will lead to overcharging over time.

Part of JAXA Safety Review for CubeSats

Inspection of the Separation Switch for Battery Charging of Maya-3 and Maya-4

Results of the Post-VT Inhibit Function Test of Maya-3 and Maya-4 Separation Switches 1

Table 1. SepSW1 Inhibit Function Test Results

Pattern	External Power Supply Current Consumption Reading, A	DMM Voltage Reading, V	H8 Debugger LED	PC Serial Display	Remarks
1	-	3.747	OFF	No Serial Data	Battery Not Charging, Satellite is OFF
2	-	3.747	OFF	No Serial Data	Battery Not Charging, Satellite is OFF
3	0.004A	3.747	OFF	No Serial Data	Battery Not Charging, Satellite is OFF
4	0.400A	3.784	OFF	No Serial Data	Battery Charging, Satellite is OFF

Maya-3 SepSW1 Inspection

Table 2. SepSW1 Inhibit Function Test Results

Pattern	External Power Supply Current Consumption Reading, A	DMM Voltage Reading, V	H8 Debugger LED	PC Serial Display	Remarks
1	-	3.802	OFF	No Serial Data	Battery Not Charging, Satellite is OFF
2	-	3.801	OFF	No Serial Data	Battery Not Charging, Satellite is OFF
3	0.004	3.802	OFF	No Serial Data	Battery Not Charging, Satellite is OFF
4	0.407	3.836	OFF	No Serial Data	Battery Charging, Satellite is OFF

Maya-4 SepSW1 Inspection

Based on the test, the ON-OFF of SepSW1 controlled by DepSW1 (Lever Switch) of both Maya-3 and Maya-4 was operating soundly after the Space Environment Tests.

Part of JAXA Safety Review for CubeSats

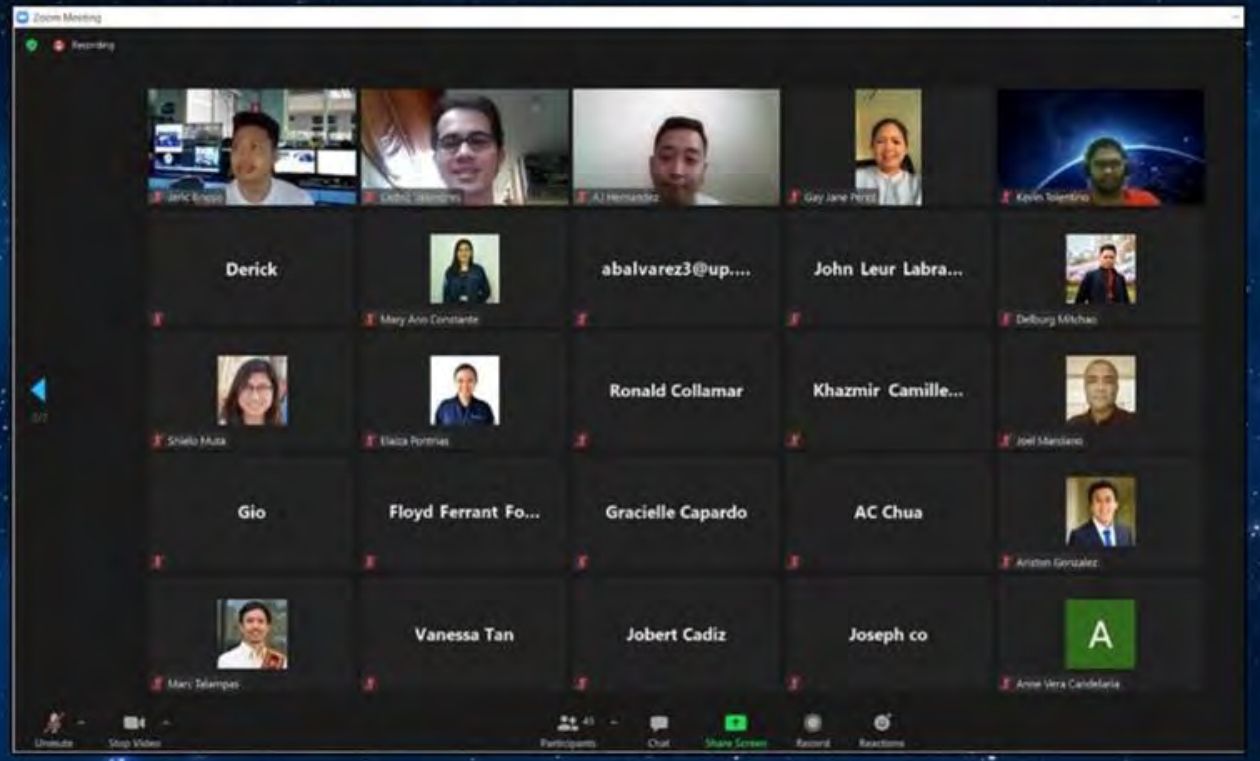
BIRDS-2S Final Development Design Review

Marielle Magbanua-Gregorio

The scholars presented their final development design review for Maya-3 and Maya-4 on March 16, 2021, where the results of the space environment tests of the flight models conducted in Kyutech, Japan, were highlighted.

BIRDS-2S Final Development Design Review

Marielle Magbanua-Gregorio



The presentation via Zoom was attended by several members from the Philippine Space Agency (PhilSA), the STeP-UP project team, the BIRDS-4S team, and other members of the STAMINA4Space Program.

BIRDS' EYE

UPDATES FROM STEP-UP BATCH 2

April 15, 2021
University of the Philippines, Diliman
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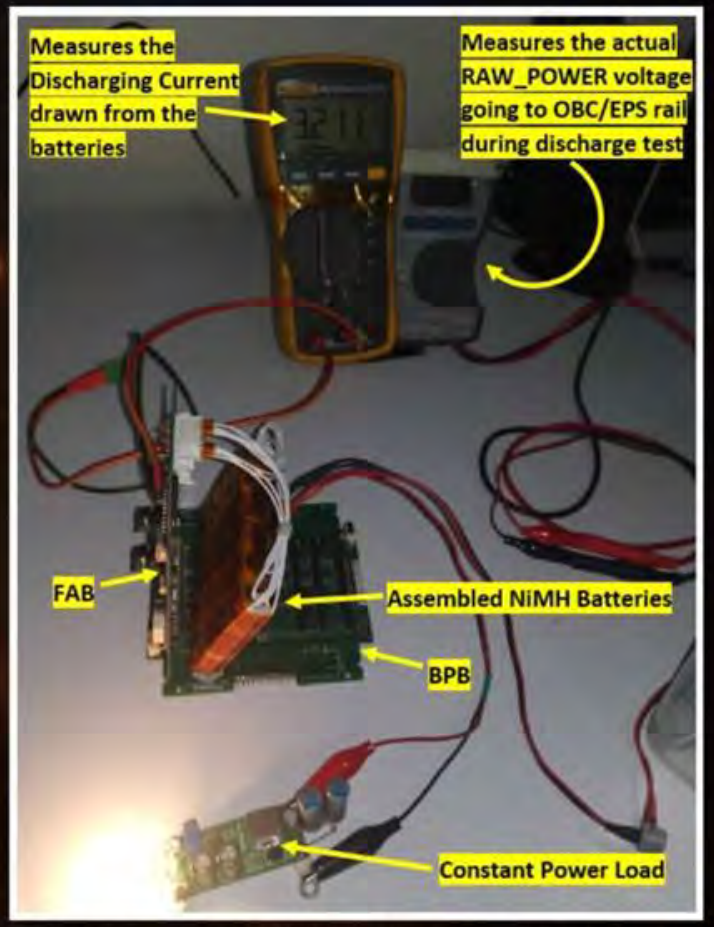
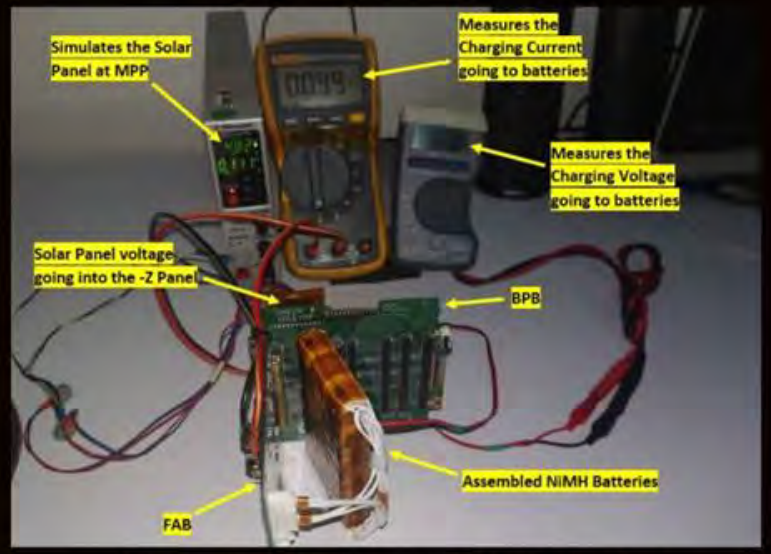
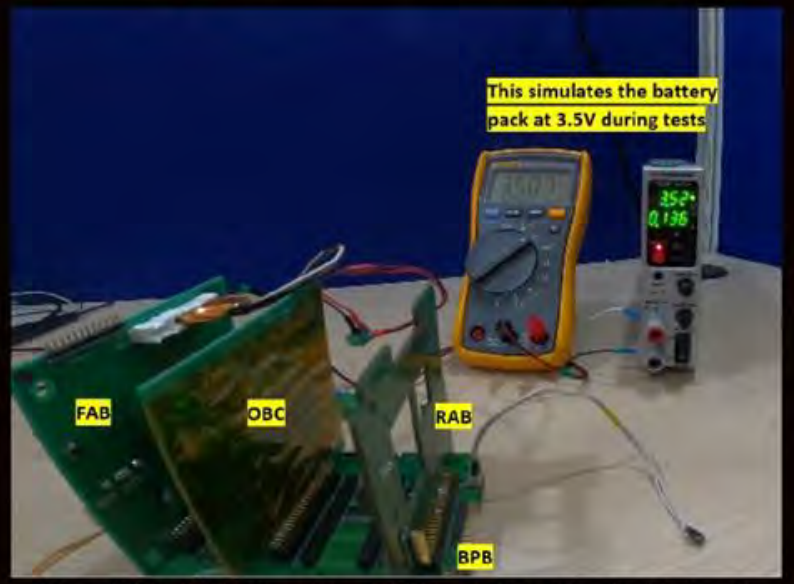


System Level Battery Discharge Tests using Constant Power Load



System Level Battery Charging via Solar Panel Tests



FAB + OBC + RAB Integration - UART communication test between MAIN PIC and Mission Bos

One of the sections of EPS of Maya-5 and Maya-6, the Battery Pack and charger, underwent battery charging and battery discharge tests to monitor their electrical performances.

For the Mission Boss: FAB, OBC, and RAB are partially integrated together with the BPB to verify the UART communication between Main PIC of OBC and Mission Boss PIC of RAB.

MISSION BOSS & EPS TESTS

WORK FROM HOME

Following the safety protocols implemented by the university because of the rising number of COVID-19 cases in Metro Manila, the second batch of the STeP-UP Project scholars are currently in a work from home setup.

We will be back in the laboratory as soon as the situation settles and the UP Diliman administration allows it.

HAPPY BIRTHDAY VAL!

The team wishes Val, who completed another revolution around the sun last March 26, a happy, happy birthday!!!

STAMINA SPACE

STeP-UP PROJECT

13. Report from Cambodia

Entrance of ITC

The following report was created by Polimey IM of Cambodia. She joins SEIC in Fall of 2021 as a PNST Fellow.

- **First, she explains who she is.**
- **Second, she discusses her role at her university, ITC.**

Hello! ស្វស្តី!

Biography:

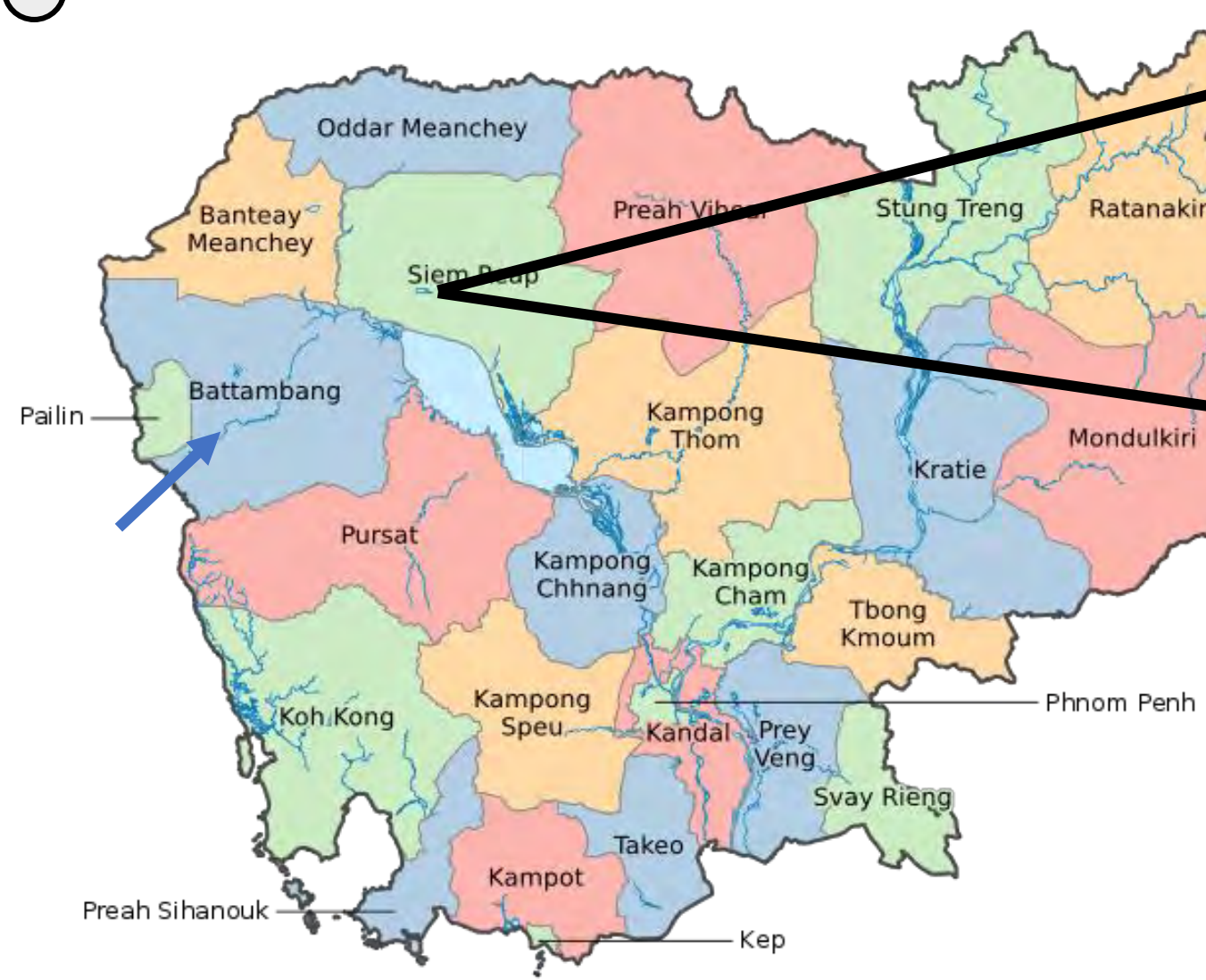
- **Name: Polimey IM**
- **Age: 22 years old**
- **Place of Birth: Battambang, Cambodia**
- **Nationality: Cambodian**
- **School: Institute of Technology of Cambodia**
- **Interested Area: Structure and Thermal**

Experiences:

- **I was a volunteer of Cambodia Red Cross from 2013 to 2016.**
- **I have joined as a member at Dynamic and Control lab in 2018.**
- **At the end of the third year, I have been interned as an AC designer.**
- **I have joined Robocon Competition in Cambodia on 03 November 2020.**
- **Currently, I am a participant of UT-ITC Cube Satellite challenge.**

- Cambodia (English) = Kampuchea (Khmer)
- The **Kingdom of Cambodia**, is a country located in the southern portion of the Indochinese peninsula in Southeast Asia.
- Total area is 181,035 square kilometers.
- Bordered by Thailand to the northwest, Laos to the northeast, Vietnam to the east and the Gulf of Thailand to the southwest.

Image Source: http://emailstosarah.blogspot.com/2012/08/the-navies-of-china-and-philippines.html (Asia Map)



Angkor Wat

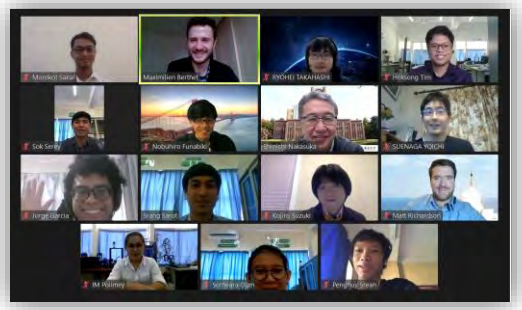
- I was born in Battambang province, near Siem Reap Province where *Angkor Wat Temple* is located.
- Angkor wat temple is the most popular place in Cambodia.

Image Source: https://en.wikipedia.org/wiki/Cambodia (Cambodia Map)

https://www.pinterest.com/pin/667377238514940851/ (Angkor Wat Temple)

I'm a member of the Dynamics and Control Lab (DCLab), led by Dr. **Sarot SRANG**, head of the Lab. In the DCLab, it has variety of projects to research and study such as:

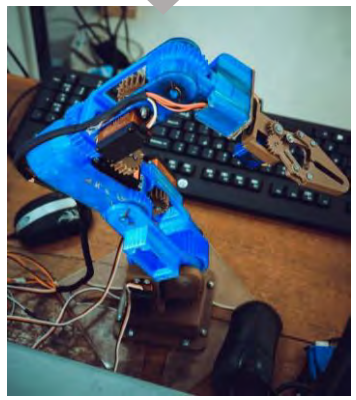
UT-ITC CubeSat Project



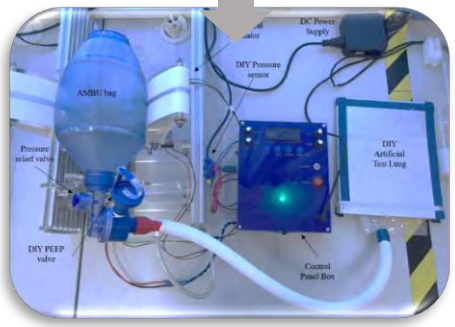
UT-ITC Cube Project Welcoming Ceremony

Mobile Robot

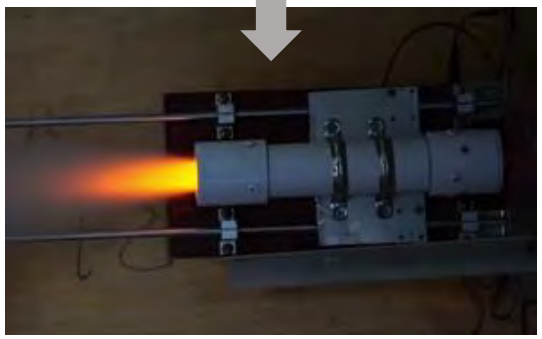
Robot Arm



Low-Cost Mechanical Ventilator

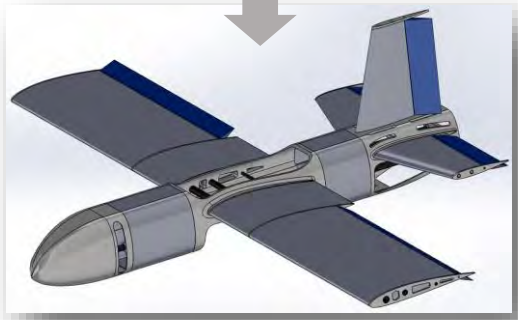


Small Rocket Project



ground fire test of the solid rocket motor

Fixed Wing Unmanned Aerial Vehicle



Second Prototype Design in SOLIDWORK

Airframe Assemble of the Second Prototype

More Info: http://dclab.itc.edu.kh

- UT-ITC CubeSat Project is a collaboration project between University of Tokyo and Institute of Technology of Cambodia.
- These are the members of the UT-ITC CubeSat Project.
- 4 mentors (top row) and 6 Participants (bottom row).


Morokot SAKAL


Nobuhiro FUNABIKI


Maximilien BERTHET


Ryohei TAKAHASHI


Yoichi SUENAGA


Jorge GARCIA

Penghuy SREAN


Sokserey SREY

Sotheara OUM


Polimey IM

MORE DETAILS HERE REGARDING THIS PROJECT: http://dclab.itc.edu.kh/ut-itc-cube-satellite-project

G. Maeda visited Polimey's university (ITC, *Institute of Technology of Cambodia*) in February of 2019.

The following is his photo report for ITC.

PHOTO REPORT 4

Visit to ITC, the main (only) engineering college of Cambodia

by G. Maeda
2019.02.20
Phnom Penh

On 19 Feb. 2019, I flew from Bangkok to Phnom Penh --- it took one hour and 15 minutes.

Mr. Sam Ban picked me up at the airport; this is in front of the airport.

IRoHa Garden Hotel

This hotel was recommended by the director of the JAXA office in Bangkok. The owner is Mr Kuroda, who hails from Osaka. He started this "boutique" hotel six years ago. Japan Embassy is a stone's throw away.

https://www.irohagarden.com/gallery

Morning Rush Hour, Phnom Phenh

Arrival at ITC at 8:00 AM on 20 FEB 2019

Institut de Technologie du Cambodge

Beautiful trees of ITC

Sam pays the driver

GM presented PNST and BIRDS to the engineering students of Dr Sarot Srang of ITC, 8:30 thru 9:30 AM on 20 February 2019

Business meeting with Mr Vuthy Monyrath (President of Japan Alumni of Cambodia) and Dr Sarot Srang, 9:30 thru 11:00 AM in the office of Dr Sarot.

AUN/SEED-Net (JICA) provided many scholarships for Cambodians to study in Japan; sadly, it has been discontinued.

TOUR OF THE LABS

Resumption of the meeting over lunch

Below:
Old Cambodia

End of PHOTO REPORT 4

by G. Maeda
2019.02.20
Phnom Penh

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"

A VISIT TO MYSA'S TESTING FACILITIES

Laboratory of Space Weather and Satellite System, College of Engineering, UiTM Malaysia has visited the Satellite Assembly, Integration and Test (AIT) Facility in Malaysian Space Agency (MYSA) on 12th April 2021. This is align with the focus of the ASEANSAT project (UiTMSAT-2) to develop the 1U CubeSat locally by utilizing the facilities available in Malaysia.

Figure 1: Teams from AIT MYSA and UiTM

The visit was basically to see the facilities that are available in MYSA that can be utilized for space environment testing of the developed Engineering Model (EM) CubeSat of UiTM. The visit started with brief discussion on the requirements and planning for the space environment testing between AIT team of MYSA and UiTM team. The discussion was done in the meeting room with social distancing and other standard operating procedures (SOP) compliances.

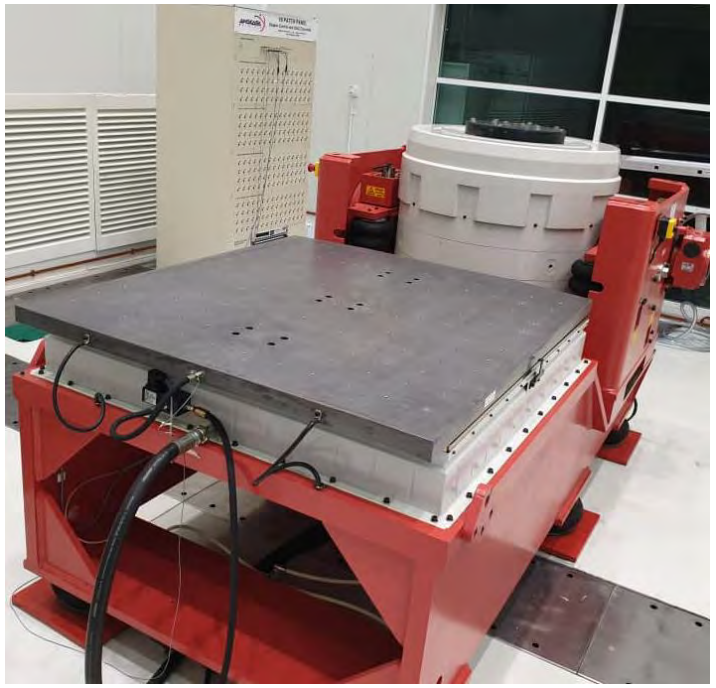
Figures 2: The discussion was done in a MYSA's meeting room. It can be seen clearly that the meeting's members were wearing face mask with social distancing in complying to the SOP of COVID-19 prevention. For information, MYSA and UiTM are located in Selangor state where the conditional movement control order (CMCO) is still ongoing. People are allowed to travel within the state only and interstate travel is not permitted without police permission.

During the discussion, UiTM team presented the requirements needed for the space environment testing. It included the components and accessories to be used during the space environment testing such as reference antenna for end-to-end test of communication system, frequency to be set for vibration test, and so on. This was to ensure that the facilities offered by MYSA can be utilized effectively for space environment testing of ASEANSAT project (UiTMSAT-2). The testing that can be performed in MYSA for the aforementioned project is as follows:

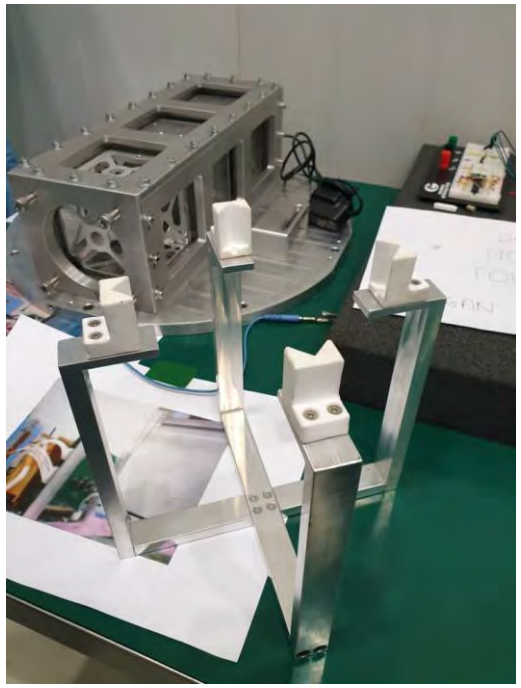
i. Vibration Test by using Shaker Machine
ii. Thermal Vacuum Test (TVT) by using the TVT Chamber
iii. Electro Magnetic Compatibility (EMC) Test by using the Anechoic Chamber
iv. Optical Calibration Test by using the Integrating Sphere

Figures 3: Dr Syazana (on the left) was explaining the requirements of EMC test to MYSA's representatives and UiTM's team members.

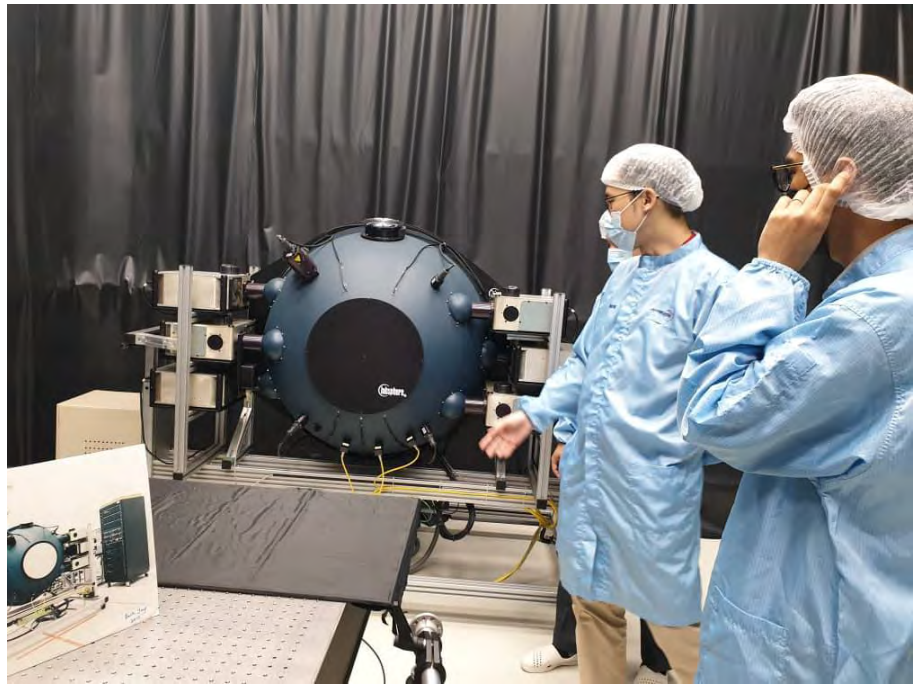
The following pictures show the AIT facilities visited by UiTM team and facilitated by MYSA team.



Figures 4: Shaker machine for vibration test in MYSA. The facility is equipped with data acquisition (DAQ) system and compatible software for various types of vibration test such as modal survey, random vibration, sine burst, and quasi static.



Figures 5: 3U pod with adaptor jig for shaker machine. There are also 2 units of dummy CubeSat to be used together with the 3U pod and a CubeSat stand.



Figures 6: The MYSA's representative was explaining about the integrating sphere for optic calibration. The device is located inside a clean booth.

Figures 7: Clean booth inside the AIT facility of MYSA is equipped with blackout static curtain.

Figures 8: MYSA's AIT facility also has Centre of Gravity machine that can be utilized for structure balancing test.

Figures 9: Some of the technical members of ASEANSAT Project. From left, Amirul, Shazwaney, Dr Huzaimy, Dr Syazana, and Fatimah. For information, ANGKASA in the picture is a Malay word that means space.

Credit to:

AGENSI ANGKASA MALAYSIA
KEMENTERIAN SAINS, TEKNOLOGI DAN INOVASI

End of Malaysia's Column

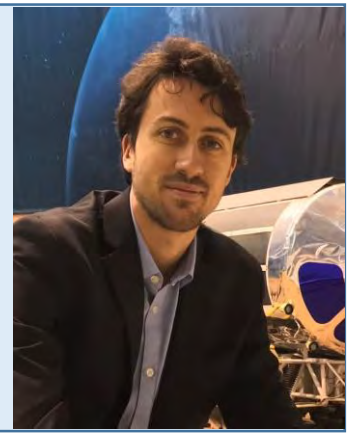
15. Report from Italy

By Paolo Marzioli, Sapienza University of Rome, 15 April 2021

A photo report from our CubeSat *WildTrackCube-SIMBA* final integration, launch and early operations

In 2019, my team at Sapienza and I, together with the researchers from Machakos University and University of Nairobi in Kenya, proposed a mission named «WildTrackCube-SIMBA» for the IAF-GK Launch Services contest for a free 1U CubeSat launch opportunity

I'm Paolo, I recently gained my PhD at Sapienza University of Rome. Between 2019 and 2020, I spent five months at Kyutech as part of my PhD research. At Sapienza, I'm working on many nano-satellite projects.



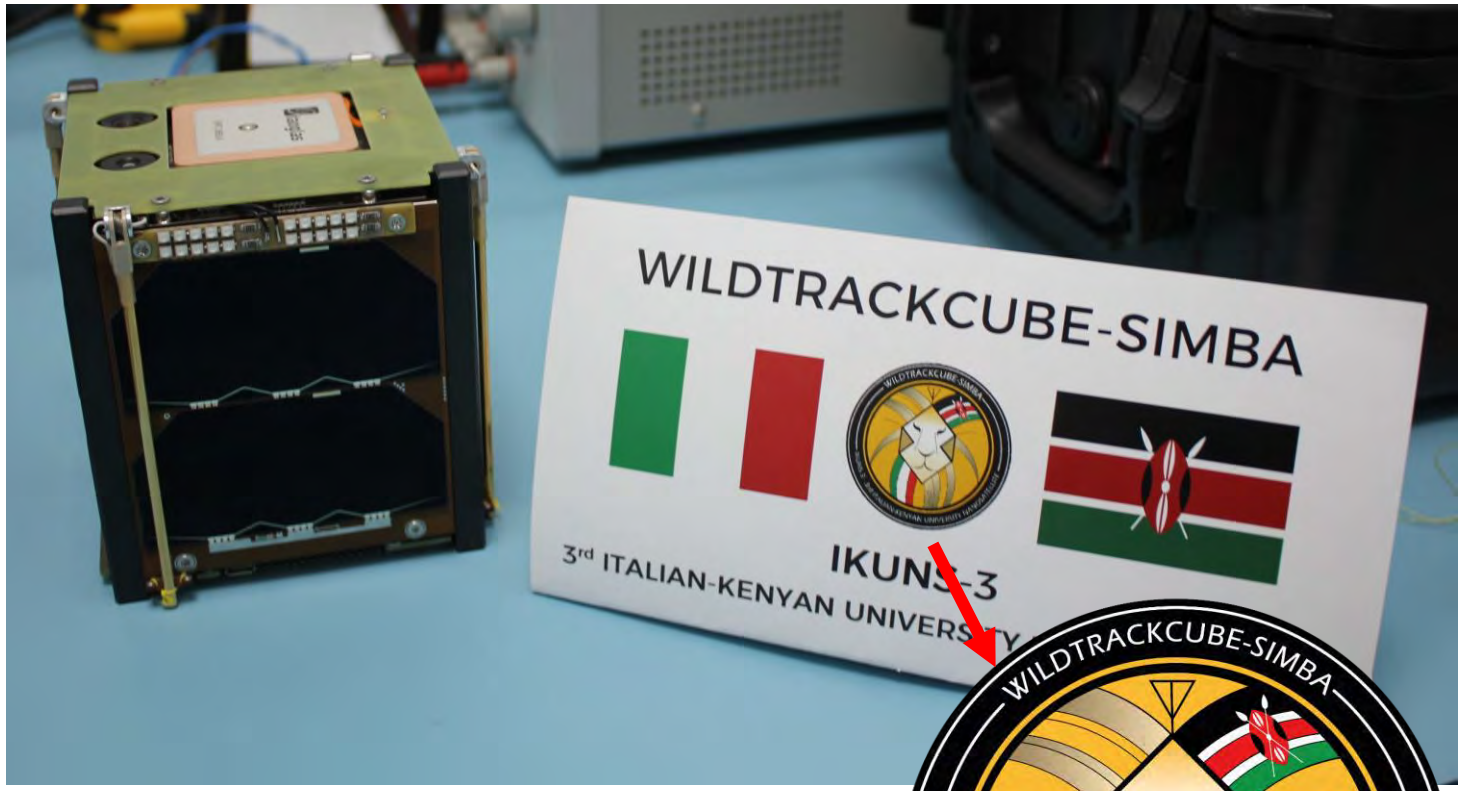
Our proposal was awarded with the first prize and we got our free launch opportunity – here is the official photo at the award ceremony at the 70th International Astronautical Congress, IAC Washington DC.

A better look to WildTrackCube-SIMBA

The satellite **WildTrackCube-SIMBA** (whose complete name is Wildlife Tracking CubeSat – System for Improving Monitoring the Behaviour of Animals) was manufactured and tested throughout 2020 by the students and researchers at our lab (S5Lab), despite all the difficulties encountered with the pandemic.

The main payload is represented by a **radio-tracking system** that will be able to track and monitor the **behavior of wildlife in Kenya**

The project is carried out by **Sapienza University of Rome**, **Machakos University** and **University of Nairobi** and supported by ASI and KSA.



The word «Simba» means lion in Swahili, so I drew the logo as a lion mane…

Satellite integration in Moscow, February 2021

As satellite integration team, we were invited to the integrator's site (GK Launch Services in Moscow) to **install our satellite in the flight deployer**. We had the chance to fly to Moscow in February, for us it was the **first chance to travel after the pandemic start**!

On its way to the deployer!

Credit GK Launch Services/Aerospace Capital

The integration team in Moscow

Postcards from Moscow

We had a bit of spare time for walking around in Moscow – with -18 °C, mountain gear was mandatory.

We visited the museum of cosmonautics with a lot of flown hardware – including some original Soyuz capsules!

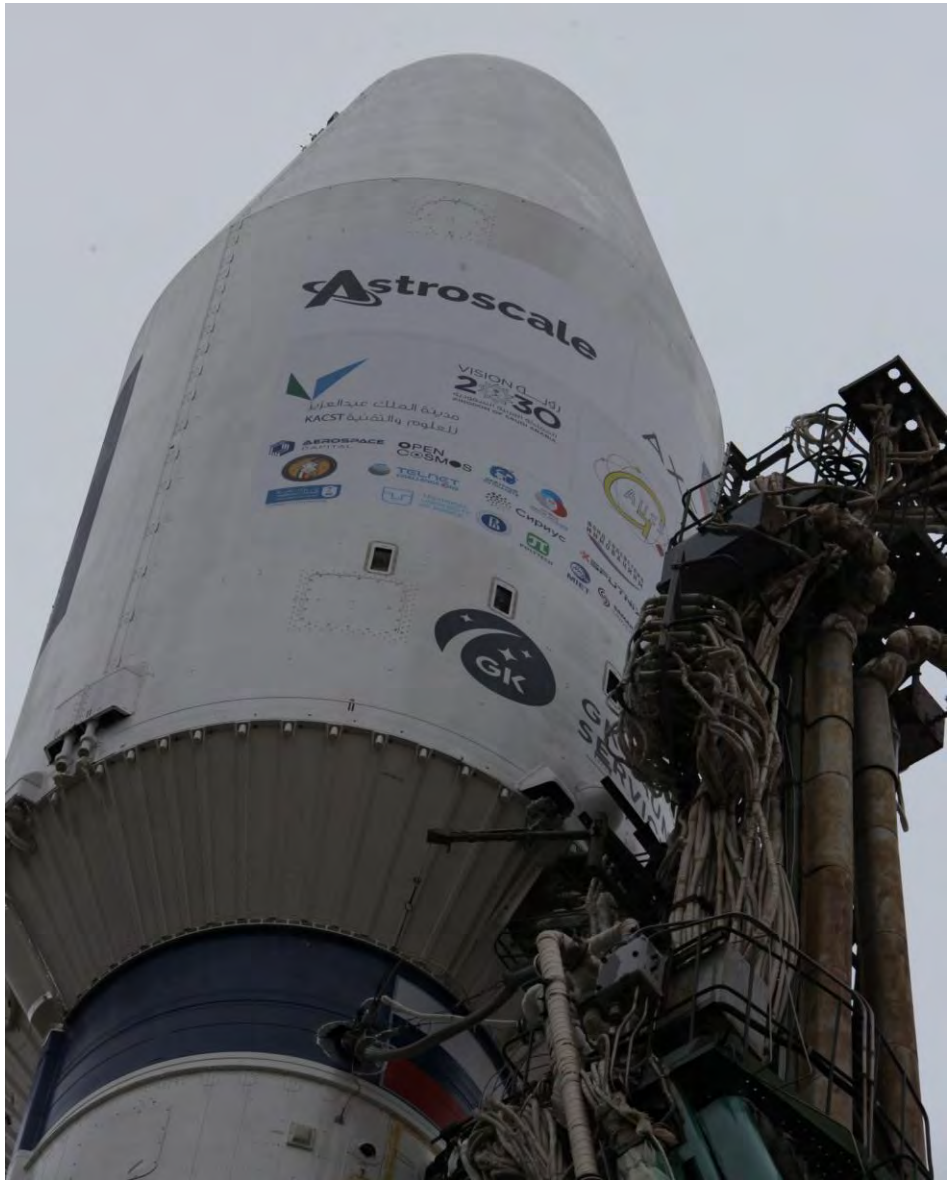
Fun fact: we had tonkotsu ramen for dinner after arriving at the hotel. You might leave Japan, but Japan never leaves you!

LAUNCH! (22 March 2021)

WildTrackCube-SIMBA was launched on a **Soyuz 2.1a / Fregat** launcher from the **Baikonur Cosmodrome** in Kazakhstan at 9.07 MSK on 22 March 2021. The Soyuz was painted in **white and blue** as Yuri Gagarin's Vostok launcher to **commemorate the 60 years of human spaceflight**.

The Soyuz fairing displayed **all the logos of** the customers – **<u>can you spot the orange patch of our mission in this picture?</u>**

Credit GK Launch Services



Credit GK Launch Services

Looking for signals (first contact!)

We received the **first telemetry packets** from WildTrackCube-SIMBA **just half an hour after deployment**, approximately at 11.30am Italian time of the launch day.

Lorenzo and I were extremely happy to **hear our little lion «roaring» from space**! Now that the commissioning phase is over, we are starting the **nominal mission tasks** – updates will follow!

End of report from Italy

GST Column

Seventh Issue: GST Updates

Pooja Lepcha and Fatima Duran

15 April 2021

Updates

GST Network countries have started to receive GSTs sent from Kyutech

Nik Amirul of Malaysia

Gary of Taiwan

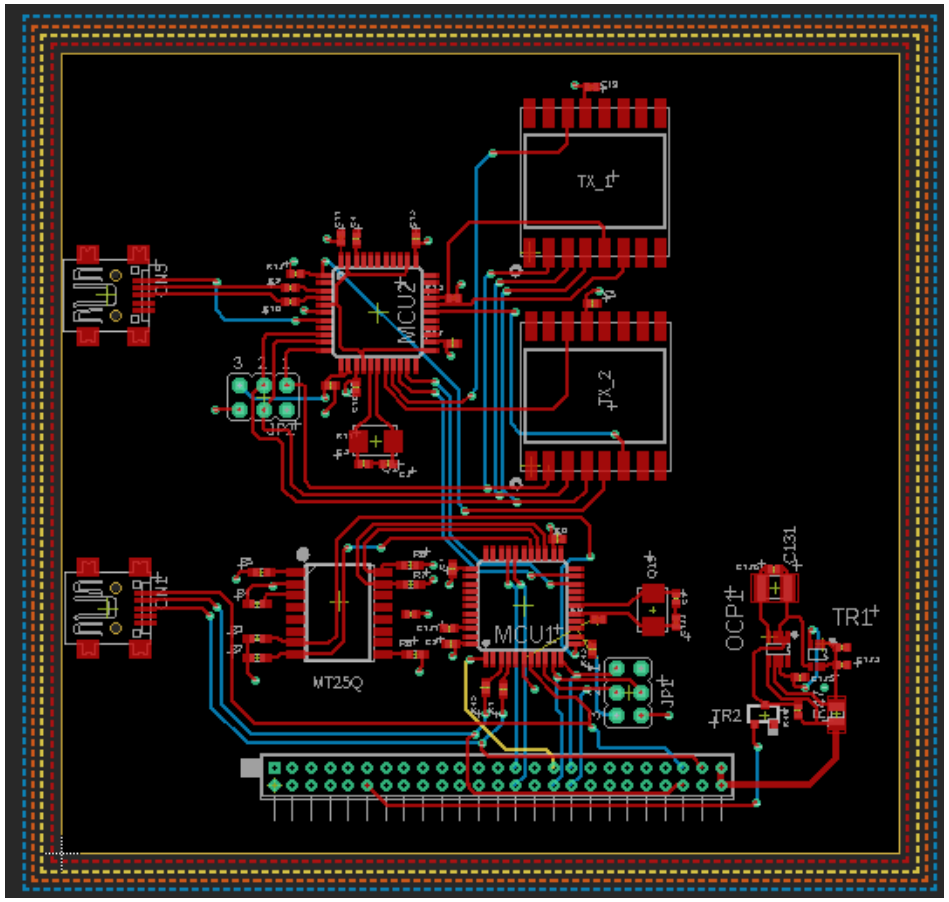
Good News for GST Network Countries!!!

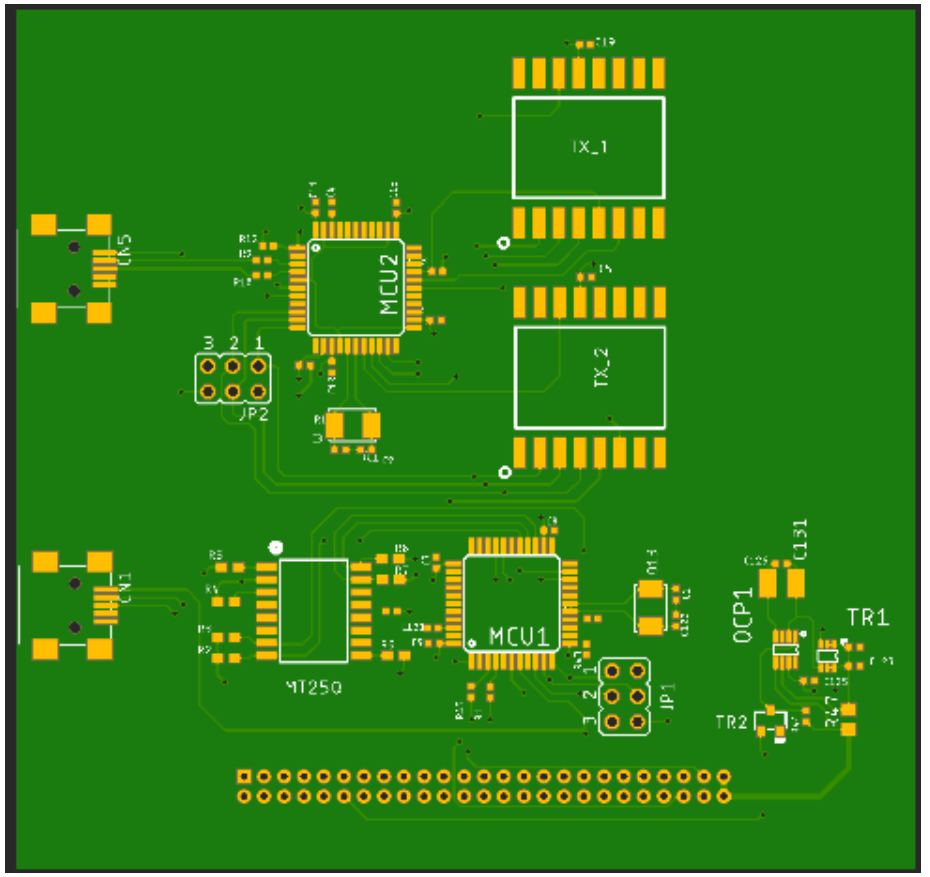
- Kyutech will fabricate a simplified version of the receiver payload that is in KITSUNE and it will be distributed to all GST Network Countries so that they can test their GSTs under construction.

Fatima is from El Salvador and she will be designing the simplified version of the LoRa receiver payload.

***Editor's Note*: Fatima has her own column. See Section 10 of this newsletter issue.**

Progress of the Design





- This design will have 2 receivers, 2 MCUs and will have 50 pin connectors and USB ports to easily program the MCUs. It will be fabricated soon and sent to all GST Network countries. Stay tuned to this column for more news in the future.

17. BIRDS-3 Project updates ------ by Pooja Lepcha, 15 April 2021

BIRDS-3 team at Kyutech bid farewell to another member of the team with this meal

Hari Dulani Kishimoto-san Pooja

Tharindu recently went back to Sri Lanka after working on KITSUNE Project.

From a team of 8 members, we are left with just 4 of us now.

QSL Cards from BIRDS-3 Team

BIRDS-3 Team continues to distribute QSL Cards to those who have been sending satellite data through our website.

If you wish to receive our QSL cards, Please send your data from BIRDS-3 here:

https://birds3.birds-project.com/outreach/document/birds-3-satellite-data-collection/

END OF BIRDS-3 PROJECT UPDATES

18. How the Tiny Kingdom of Bhutan Out-Vaccinated Most of the World

Editor's note:
Bhutan is a member of the BIRDS-2 Project

The New York Times | https://www.nytimes.com/2021/04/18/world/asia/bhutan-vaccines-covid.html

How the Tiny Kingdom of Bhutan Out-Vaccinated Most of the World

The Himalayan nation has given more than 60 percent of its people a shot. Some villages were reached by helicopter, and health workers hiked through ice and snow.

By Chencho Dema and Mike Ives

April 18, 2021, 4:08 a.m. ET **2021.04.18**

THIMPHU, Bhutan — The Lunana area of Bhutan is remote even by the standards of an isolated Himalayan kingdom: It covers an area about twice the size of New York City, borders far western China, includes glacial lakes and some of the world's highest peaks, and is inaccessible by car.

Still, most people living there have already received a coronavirus vaccine.

Vials of the Oxford-AstraZeneca vaccine arrived last month by helicopter and were distributed by health workers, who walked from village to village through snow and ice. Vaccinations proceeded in the area's 13 settlements even after yaks damaged some of the field tents that volunteers had set up for patients.

"I got vaccinated first to prove to my fellow villagers that the vaccine does not cause death and is safe to take," Pema, a village leader in Lunana who is in his 50s and goes by one name, said by telephone. "After that, everyone here took the jab."

Lunana's campaign is part of a quiet vaccine success story in one of Asia's poorest countries. As of Saturday, Bhutan, a Buddhist kingdom that has emphasized its citizens' well-being over national prosperity, had administered a first vaccine dose to more than 478,000 people, over 60 percent of its population. The Health Ministry said this month that more than 93 percent of eligible adults had received their first shots.

Helicopters were crucial for distributing the vaccine to parts of mountainous Bhutan. Bhutan Ministry of Health

The vast majority of Bhutan's first doses were administered at about 1,200 vaccination centers over a weeklong period in late March and early April. As of Saturday, the country's vaccination rate of 63 doses per 100 people was the sixth highest in the world, according to a New York Times database.

That rate was ahead of those of the United Kingdom and the United States, more than seven times that of neighboring India and nearly six times the global average. Bhutan is also ahead of several other geographically isolated countries with small populations, including Iceland and the Maldives.

Dasho Dechen Wangmo, Bhutan's health minister, attributed its success to "leadership and guidance" from the country's king, public solidarity, a general absence of vaccine hesitancy, and a primary health care system that "enabled us to take the services even to the most remote parts of the country."

"Being a small country with a population of just over 750,000, a two-week vaccination campaign was doable," Ms. Dechen Wangmo said in an email. "Minor logistic issues were faced during the vaccination but were all manageable."

All of the doses used so far were donated by the government of India, where the drug is known as Covishield and manufactured by the Serum Institute of India, the world's largest vaccine producer. Bhutan's government has said it plans to administer second doses about eight to 12 weeks after the first round, in line with guidelines for the AstraZeneca vaccine.

The New York Times

A Buddhist ritual as vaccine doses arrived in Lhuntse, Bhutan, in an image posted to Facebook by the country's health ministry. Bhutan Ministry of Health

Will Parks, the representative in Bhutan for UNICEF, the United Nations agency for children, said the first round was a "success story, not only in terms of the coverage but also in the way the vaccination drive was executed collectively from the planning to the implementation."

"It involved participation from the highest authority to local community," he said.

The campaign has relied in part on a corps of volunteers, known as the Guardians of the Peace, who operate under the authority of Bhutan's king, Jigme Khesar Namgyel Wangchuck.

In Lunana, eight volunteers pitched field tents and helped carry oxygen tanks from village to village, said Karma Tashi, a member of the government's four-person vaccination team there. The tanks were a precaution in case any villagers had adverse reactions to the shots.

To save time, Mr. Tashi said, the team administered vaccines by day and walked between villages by night — often for 10 to 14 hours at a time.

The yak damage to the tents wasn't the only hiccup. Some villagers did not initially show up to be vaccinated because they were busy harvesting barley, or because they worried about possible side effects. "But after we told them about the benefits, they agreed," Mr. Tashi said.

The New York Times

Vaccinating a resident of the district of Pema Gatshel. Bhutan Ministry of Health

As of April 12, 464 of Lunana's 800 or so residents had gotten a first dose, according to government data. The population figure includes minors who are not eligible for vaccines.

Health care in Bhutan, a landlocked country that is slightly larger than Maryland and borders Tibet, is free. Between 1960 and 2014, life expectancy there more than doubled, to 69.5 years, according to the World Health Organization. Immunization levels in recent years have been above 95 percent.

But Bhutan's health system is "hardly self-sustainable," and patients who need expensive or sophisticated treatments are often sent to India or Thailand at the government's expense, said Dr. Yot Teerawattananon, a Thai health economist at the National University of Singapore.

A government committee in Bhutan meets once a week to make decisions about which patients to send overseas for treatment, Dr. Yot said. He said the committee — which focuses on brain and heart surgery, kidney transplants and cancer treatment — was known informally as the "death panel."

The New York Times

"I don't think they could cope with the surge of severe Covid cases if that happened, so it is important for them to prioritize Covid vaccination," he said, referring to Bhutan's health authorities.

Bhutan has reported fewer than 1,000 coronavirus infections and only one death. Its borders, tight by global standards even before the pandemic, have been closed for a year with few exceptions, and anyone who enters the country must quarantine for 21 days.

Masked pedestrians in Thimpu. Bhutan has reported only one Covid-19 death. Associated Press

That includes the prime minister, Lotay Tshering, who received his first vaccine dose last month while in quarantine after a visit to Bangladesh. He has been supporting the vaccination effort in recent weeks on his official Facebook page.

“My days are dotted with virtual meetings on numerous areas that need attention, as I closely follow the vaccination campaign on the ground,” Dr. Tshering, a surgeon, wrote in early April. “So far, with your prayers and blessings, everything is going well.”

The economy in Lunana depends on animal husbandry and harvests of a so-called caterpillar fungus that is prized as an aphrodisiac in China. People speak Dzongkha, the national language, and a local dialect.

Last year, the drama “Lunana: A Yak in the Classroom” became the second film ever selected to represent Bhutan at the Academy Awards. It was filmed using solar batteries, and its cast included local villagers.

Lunana’s headman, Kaka, who goes by one name, said the most important part of the vaccination campaign was not on the ground, but in the sky.

“If there hadn’t been a chopper,” he said, “getting the vaccines would have been an issue, since there’s no access road.”

Face masks for sale in Thimpu. Associated Press

The New York Times

Chencho Dema reported from Thimphu, Bhutan, and Mike Ives from Hong Kong.

End of the New York Times article

The Economist

Covid-19 in Bhutan

One-week wonder

A tiny Himalayan kingdom sets the global pace for vaccinations

WHEN INDIA presented Bhutan with a generous gift of covid-19 vaccines in January, the neighbouring kingdom made an unusual choice. Rather than rush to inoculate all 800,000 of its citizens, the government sought advice from the Zhung Dratshang, a body of Buddhist monks. The stars were not auspicious, they ruled. Better to wait two months, and then to make sure that the first dose be both administered by, and given to, a woman born in the Year of the Monkey.

So Bhutan waited until March 27th before Tshering Zangmo administered the first jab to Ninda Dema. The injection took place at a school in the capital, Thimphu, at the auspicious hour of 9.30am, after prayers were chanted and butter lamps lit. But then there was no dallying. Within a single week a world-beating 85% of Bhutan's adult population had received a first shot. Only two countries, Israel and the Seychelles, have vaccinated a (slightly) higher proportion of people, but both took months to do so (see chart).

Credit is due not only to Bhutan's astrologers, but also to its political leaders. Jigme Khesar Namgyel Wangchuck, the "Dragon King", formed the Guardians of Peace, an orange-jumpsuited national-service corps that has helped to set up and staff more than 1,700 vaccination stations across the country. The prime minister, Lotay Tshering, is himself a doctor and the health minister, Dechen Wangmo, holds degrees in cardiology and epidemiology from prestigious American universities.

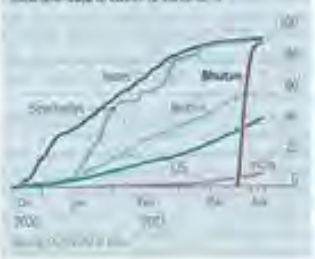
Elected in 2018 on a platform that emphasised public health, their government has responded vigorously to the pandemic. Quarantine measures have been strict: in March the king himself spent a mandatory week in isolation after returning to Thimphu from a tour of southern provinces, and the prime minister locked himself away for 21 days following an official trip to Bangladesh.

Mr Tshering, whose Facebook page is largely devoted to keeping the public informed about covid-19, explains that because the logistics of vaccine storage and delivery are complex, and because some people suffer side effects and everyone will need a booster shot, it made sense to foster popular acceptance by turning the campaign into a lively national event. The tight schedule was sensible for another reason, too. India, Bhutan's traditional benefactor, did not provide its tiny ally with a full vaccine supply all at once. Waiting for enough to arrive allowed the Bhutanese to avoid rationing. By vaccinating everyone quickly, Bhutan has also put subtle pressure on India, which is facing its own supply troubles, to deliver the required boosters soon.

Although Bhutan has suffered only a single death from covid-19, it is not without troubles. Unemployment is at a record high, albeit of only 5%. The cost of green chillies, a main ingredient (along with yak cheese) of ema datshi, the staple dish, has reached an eye-watering 700 ngultrum a kilo—nearly $10. The home minister recently resigned after allegedly making a false insurance claim on his car. Another scandal, involving army officers and judges, plus a lady go-between, is making tongues wag. Then again, these are problems the rest of the world would love to have. ■

A country of steep slopes

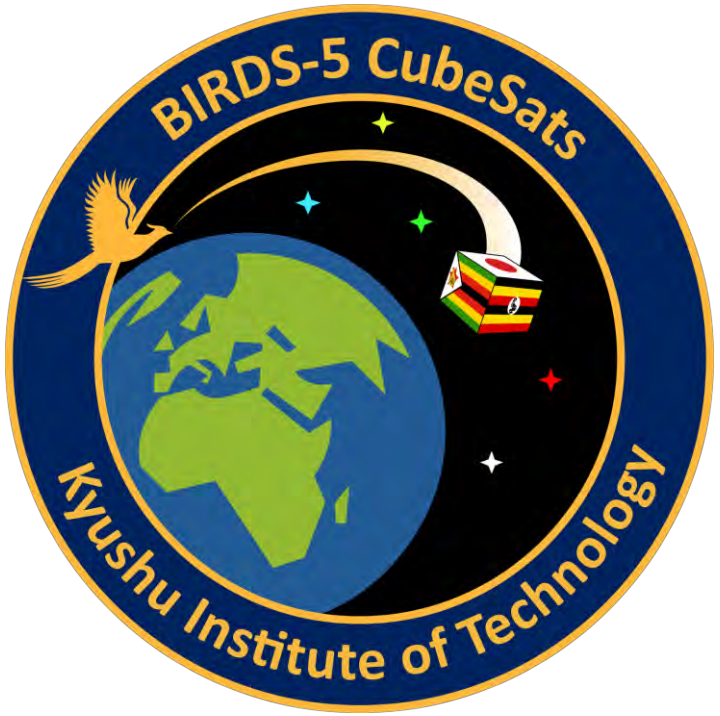
Adult population who have received at least one dose of covid-19 vaccine, %



← **The Economist also covered this Bhutan story regarding the fast pace of vaccinations. See the graph at the bottom.**

Amazing deployment speed.

End of the news from Bhutan



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

Simultaneous Observations between BIRDS-5 and Arase

Iku Shinohara, and PINO team

April 8, 2021

Why do we need simultaneous observations?

As described in serial articles (in BIRDS Newsletter No. 58-62) by the PINO team, PINO will observe precipitating high energy electrons from the Earth's outer radiation belt.

A major population of high-energy electrons in the radiation belts is trapped in the geomagnetic fields, bouncing between north and south. However, recent research results reveal that plasma waves excited in the heart of the outer radiation belt possibly cause the precipitation of the radiation belt electrons into the upper atmosphere along the geomagnetic fields due to the result of the wave-particle interaction.

To demonstrate that plasma waves really contribute to the loss of the radiation belt electrons, simultaneous observations both at the Low-Earth-Orbit (Result: electron precipitation) and the Medium-Earth-Orbit (Cause: wave-particle interaction) are necessary.

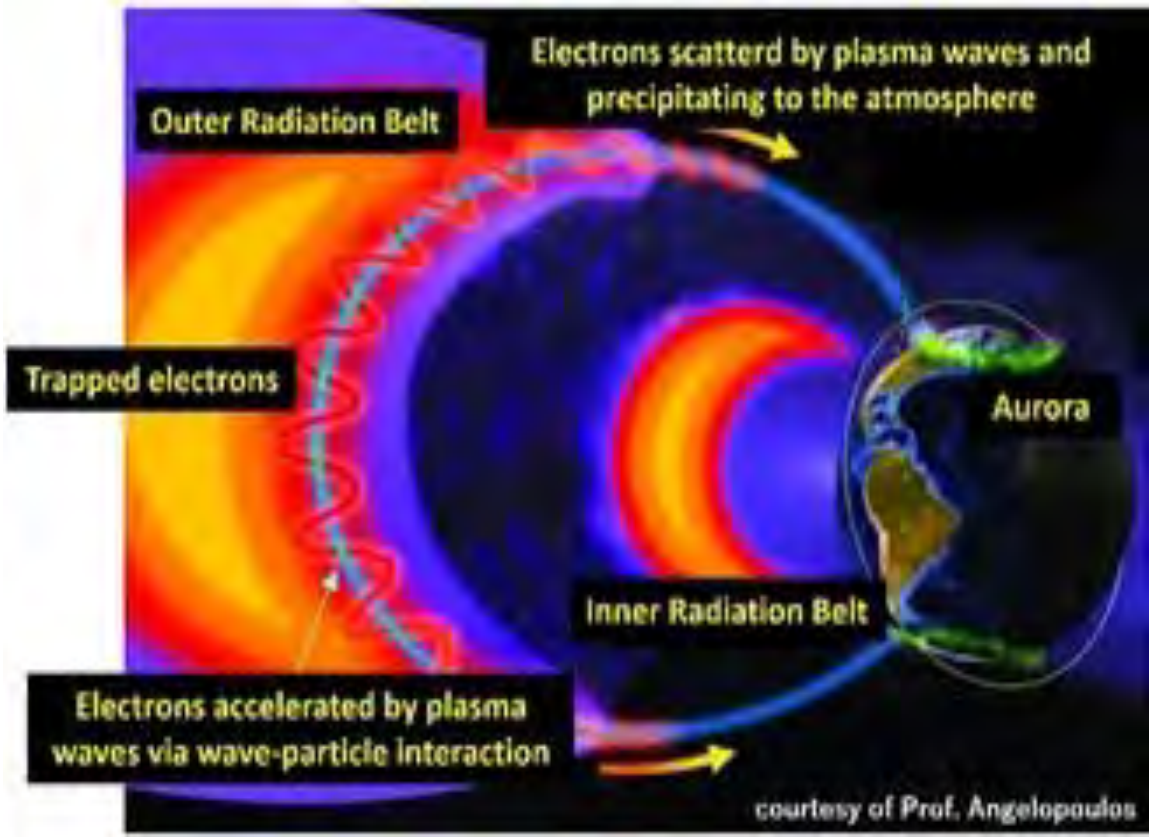


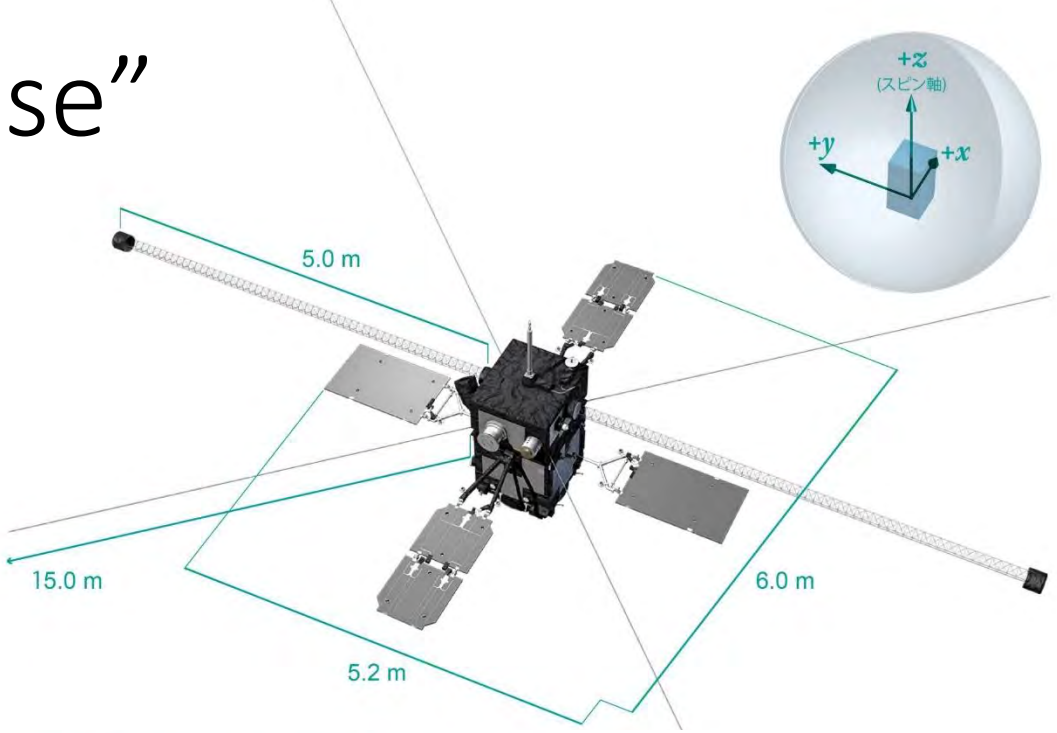
Figure: A schematic illustration of the radiation belt dynamics.

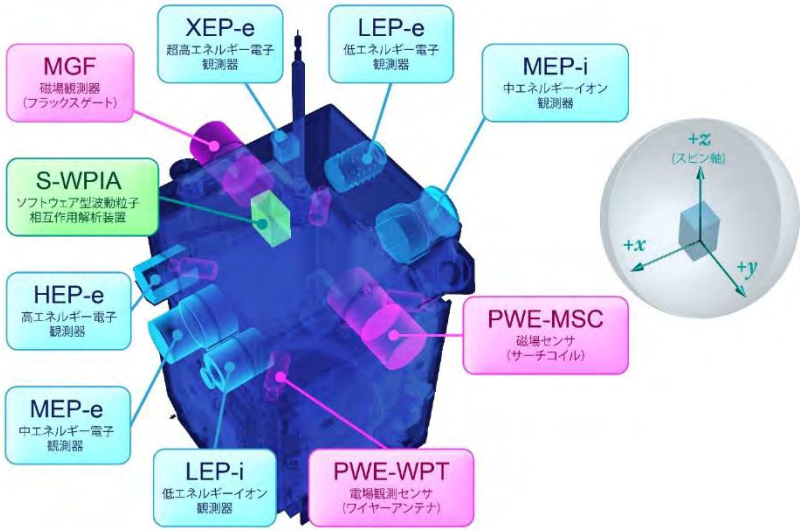
The geospace explorer “Arase”

The geospace explorer “Arase” was developed as the second small science satellite of JAXA/ISAS under collaboration with universities and institutes in Japan and Taiwan. The Arase satellite was successfully launched on December 20, 2016.

The mission objective is to understand the dynamic variation of the geospace. “Arase” challenges the scientific mysteries of the radiation belts. Coming experimental results are expected to contribute to improvements in space weather forecasting.

Nine mission instruments are on board the spacecraft, and they ‘in-situ’ measure high-energy particles, plasma, and electromagnetic fields in detail. Notably, the electron analyzers can cover a wide energy range from 20 eV to 20 MeV, and the electromagnetic-field-instruments can observe a wide frequency range from DC to 20 kHz.





Conjunctions between BIRDS-5 and Arase

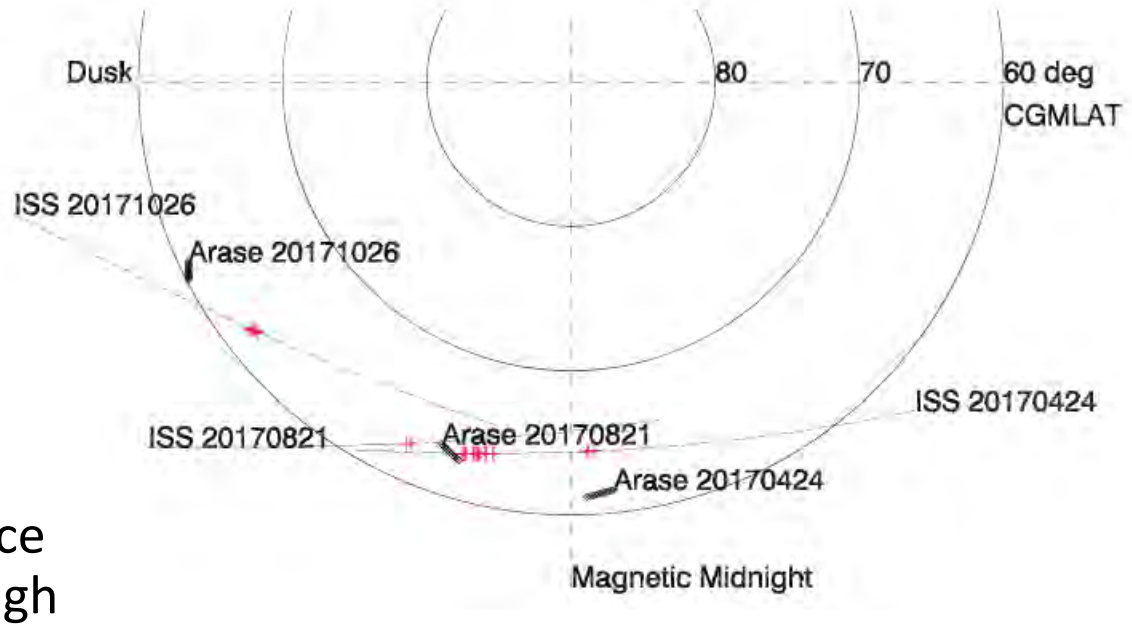
The Arase's orbit is designed as follows, and it covers the heart of the outer radiation belt.

- The perigee altitude: about 400 km
- The apogee altitude: about 32,000 km
- The inclination: about 31 degrees.

Since the orbit is elliptic, Arase stays in the outer radiation belt for about a half or more of the orbital period = about 570 minutes.

The orbit of BIRDS-5 will be almost the same as the International Space Station (ISS). The altitude is about 400 km and the orbital period is about 90 minutes. Since ISS's inclination is about 51 degrees, ISS can pass through the region where the geomagnetic latitude is higher than 60 degrees. Thus, BIRDS-5 can also observe the precipitation electrons from the outer radiation belt.

We will arrange good coordinate observations between BIRDS-5 and Arase.



Examples of conjunction events between ISS and Arase. Footprint (along the geomagnetic field line) trajectories of both spacecraft are projected at the 100 km altitude. Figure 1 of Kataoka et al. (2020), J. Geophys. Res. https://doi.org/10.1029/2020JA027875

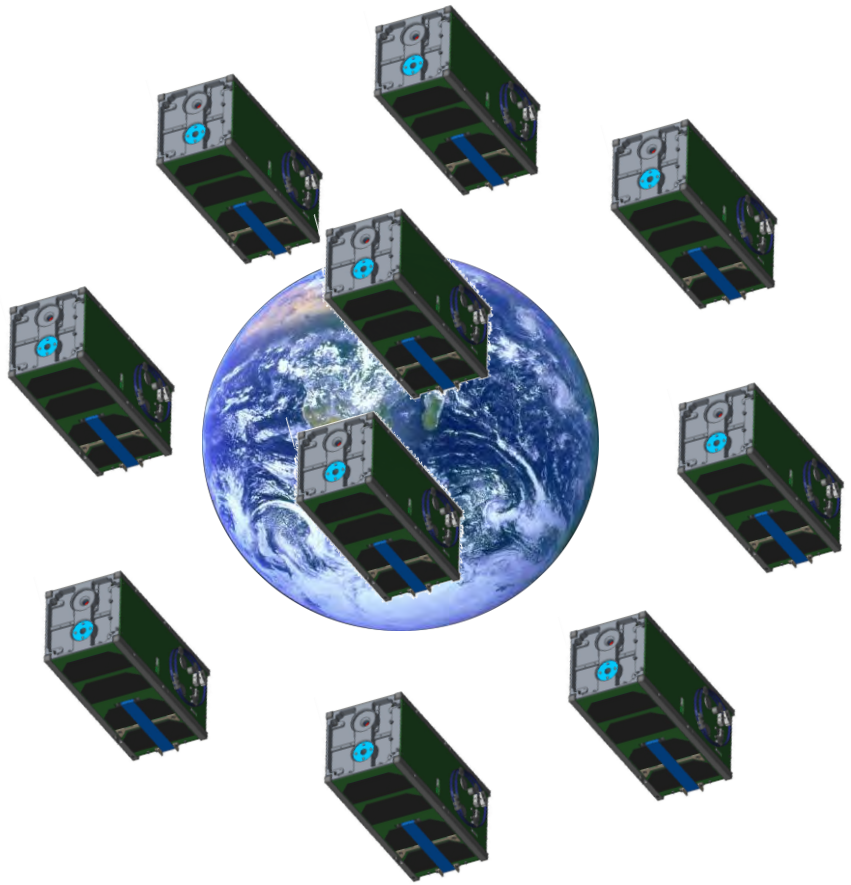
Multi-satellite measurements in geospace

Nowadays, a lot of high-quality ‘in-situ’ observation data related to geospace phenomena are available. However, we cannot determine whether the observed variations in the time-series data are due to spatial structures or to time variations with only one-point measurement.

Therefore, we have highly desired multi-point ‘in-situ’ measurement in space, and the space science mission by four spacecraft fleet (e.g., ESA/Cluster, NASA/MMS) have already been achieved. They have successfully resolved the local structure in geospace.

However, to address the global dynamics of geospace phenomena, we need much more observation points, a few tens or more points. To achieve such super-multi-point measurement, the platform based on the CubeSat architecture is very attractive.

We expect that PINO onboard BIRDS-5 becomes the first step of our future challenges to super-multi-point measurement in space.



End of this section

HANAMI CULTURE

By : Fukudome Shoma

2021/04/08

HANAMI CULTURE

- Japanese people cherish the four seasons.
- Hanami is an essential cultural expression of the changing of the seasons.
- Japanese people used to enjoy viewing plum blossoms in spring a long time ago, but now Japanese people enjoy viewing cherry blossoms.

Four Seasons

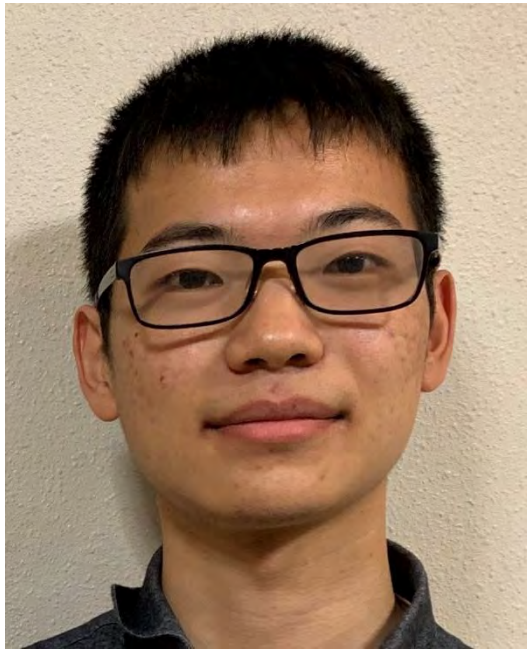
In Japan, there are four seasons

- **Spring** March to May
- **Summer** June to August
- **Fall** September to November
- **Winter** December to February

Each season has its own merits and Japanese people enjoy the changes of the four seasons.

Mission Boss and CPLD

CPLD = complex programmable logic device

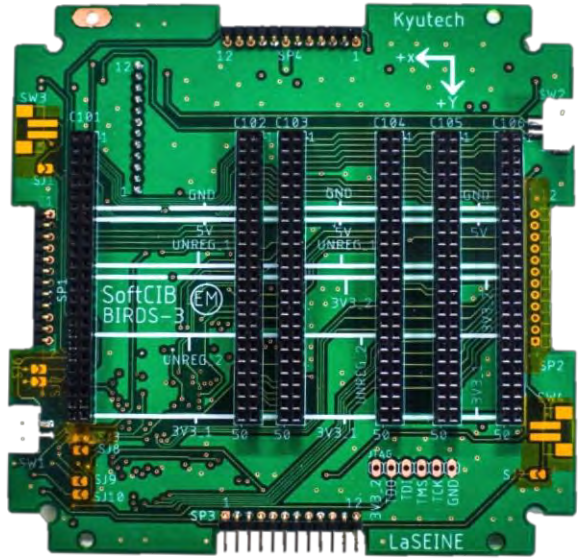


By: Yukihisa Otani

April 14, 2021

The BackPlane Board (BPB) Design

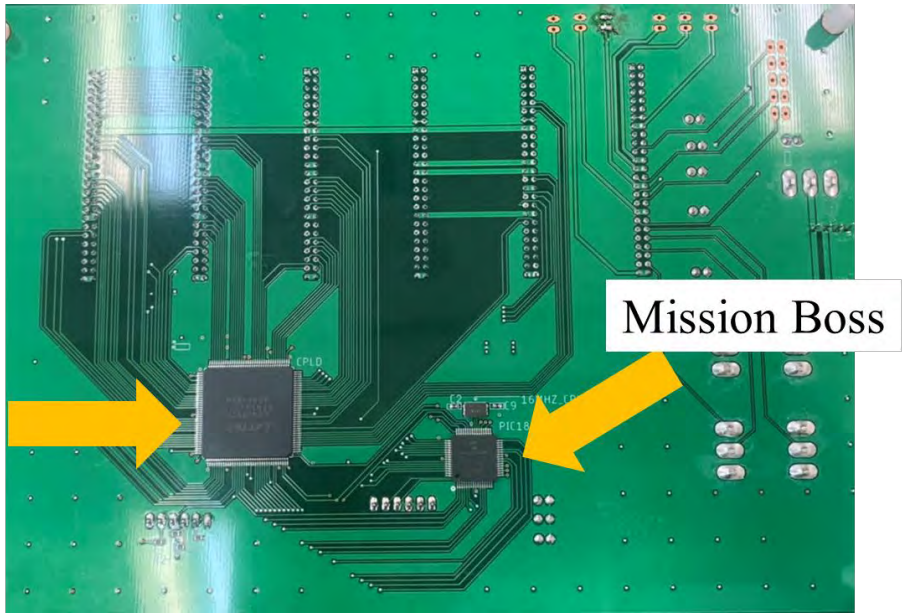
- BPB is a main part of the satellite internal system.
- BPB has four functions:
    1. Connect between each Sub System boards.
    2. Make it easy to integrate Bus System and Mission System
    3. Reduce the difficulty in the CubeSat assembly.
    4. Reduce the usage of harnesses in CubeSat.



Picture1. Back Plane
(BIRDS デジタル教科書)

Mission Boss and CPLD

- Mission Boss and CPLD are mounted on the BPB.
- These components make the BPB more flexible and smarter.

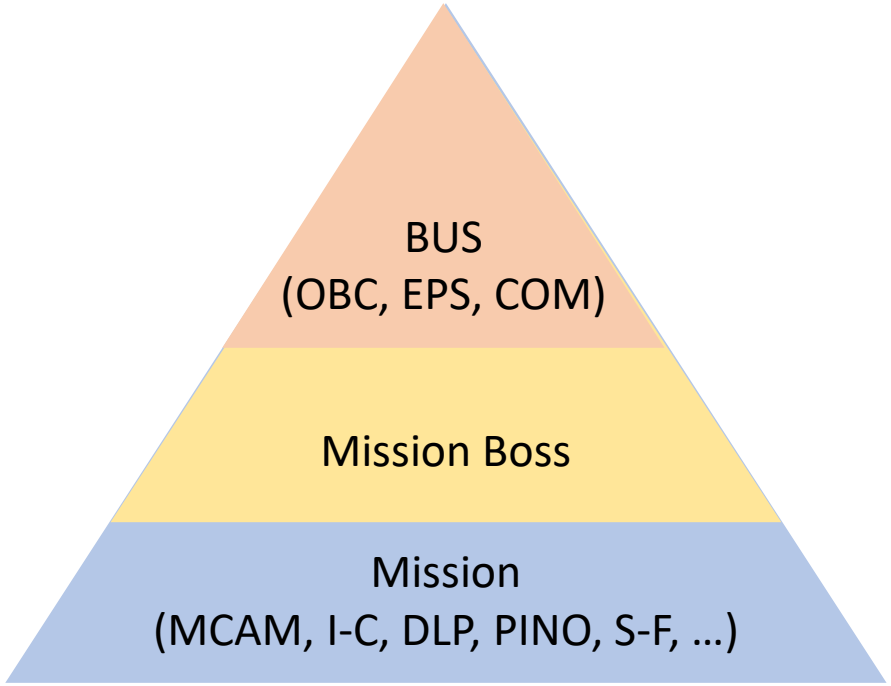


Picture2. BIRDS-5 BPB BBM

The benefit and role to set the Mission Boss

Benefit

1. Distinguish Bus System and Mission System.
2. Make the system hierarchy clear and simple.
3. Decrease the amount of Main code and task.



Role

1. Control the switch for each mission power
2. Control the switch for each mission data transferring
3. Transfer the command from Main to Mission

CPLD make the BIRDS BUS more flexible

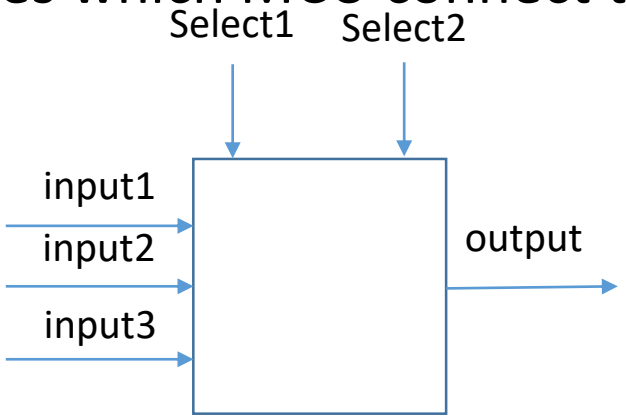
- Changing the roots
  - →CPLD likes the switch rail for the train.
    The developer can assign the output pin where the internal signal goes.
  - Even if the Mission Board pin assignment is changed, we would need not to change the BPB and the other boards design.

It is not necessary to change the pin assignment board A when the position of the pins are changed from Board B to B’.

CPLD make the BIRDS BUS more flexible

- Doing the MUX function
  - →CPLD can select the output pin based on the input signal likes the MUX. This function is very useful when the number of the pins is limited.

(In BIRDS-5 design, there is only one set for the Flash Memory on OBC 50pin connector. Mission MCUs connect to the CPLD. Then Mission Boss handles which MCU connect to the Flash Memory.)



Select1	0	1	0	1
Select2	0	0	1	1
Output	input 1	input 2	input 3	X

The Future benefits

- BIRDS BUS should be flexible and simple to be developed by those who have never experienced it.
  →By connecting the Digital pins on 50pins (Mission Board-1,2 and RAB) to CPLD, it is not necessary to re-design every time develop the new satellite.

- Mission Payload should be separated from BIRDS-BUS.
  →Mission Boss is the head of all of Mission MCUs. Then Mission Boss communicates the Main PIC.

Structural analysis

By : Takashi Oshiro

2021/4/9

Satellite structure

- Before launching satellites, we need to meet a lot of requirements. Such as size, weight, protrusion, outgas, strength, functionality, safety, RF transmitter…
- To verify that our satellite satisfy these requirements, we prepare some documents which include the results of various tests, analysis.
- For satellite structure, we have a lot of tasks to do for preparing these documents. Vibration tests and structural analysis are our tasks.

https://www.jaxa.jp/countdown/h2bf3/special/img/h2b_02_1366.jpg

Structural analysis


Kyushu Institute of Technology
Department of Applied Science for Integrated System Engineering

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

BIRDS-4 Project

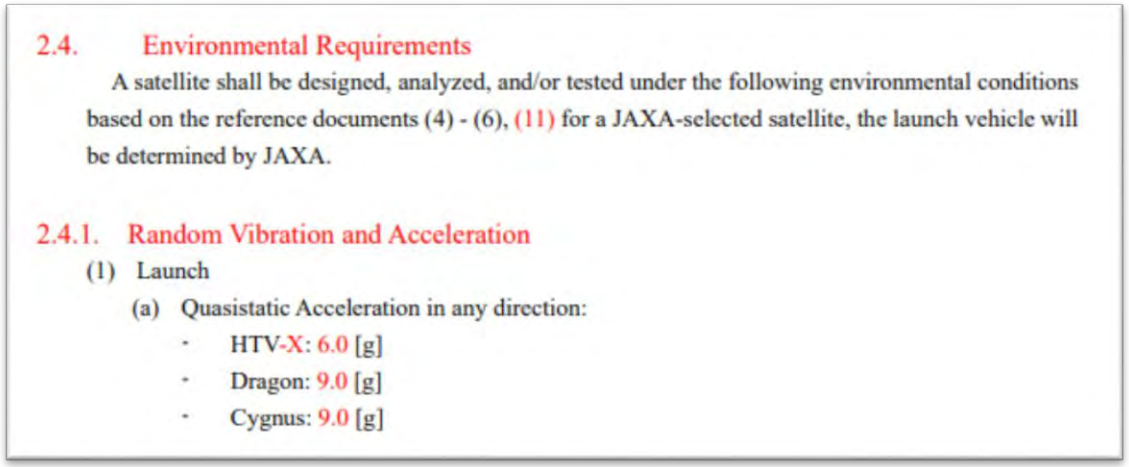
Structural Analysis Report

Laboratory of Spacecraft Environment Interaction Engineering

- Structural analysis is required to review the satellite design. Usually we will order the structure frame after we conclude that the structure has enough strength against the launch environment. We also do physical feasibility study like checking if there is no structural interference.
- Structural analysis report is supposed to be submitted to JAXA. It shows the stress value of each frame and screw in the satellite.

Static analysis

- According to JAXA's Payload Accommodation Handbook, the maximum gravity applied by the rocket during launch is 9[G]. So this value is used as the condition of the static analysis.
- Applying 46.6[N] to the end surface of each rail is also written in this document as the satellite condition in the launcher pod.



2.4. Environmental Requirements

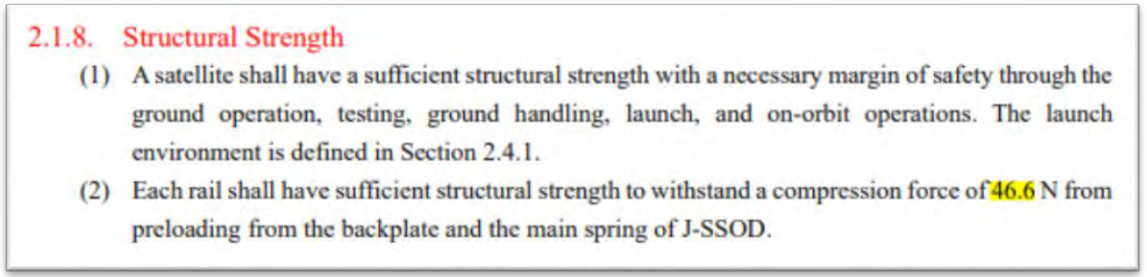
A satellite shall be designed, analyzed, and/or tested under the following environmental conditions based on the reference documents (4) - (6), (11) for a JAXA-selected satellite, the launch vehicle will be determined by JAXA.

2.4.1. Random Vibration and Acceleration

(1) Launch

(a) Quasistatic Acceleration in any direction:

- HTV-X: 6.0 [g]
- Dragon: 9.0 [g]
- Cygnus: 9.0 [g]



2.1.8. Structural Strength

(1) A satellite shall have a sufficient structural strength with a necessary margin of safety through the ground operation, testing, ground handling, launch, and on-orbit operations. The launch environment is defined in Section 2.4.1.

(2) Each rail shall have sufficient structural strength to withstand a compression force of 46.6 N from preloading from the backplate and the main spring of J-SSOD.

https://humans-in-space.jaxa.jp/kibouser/provide/j-ssod/

Preparation for analysis

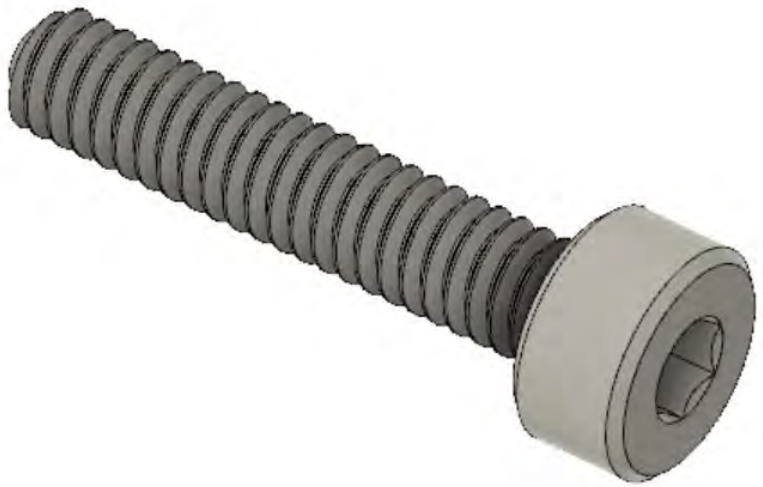
- Material definition

→Define the material for each component. You can run the analysis even using different materials, then compare with the results.

- Simplification

→It takes a lot of time or sometimes fails when you do meshing structure because of too detailed component. It’s better to simplify the structure.

We have more tasks to do for the preparation…

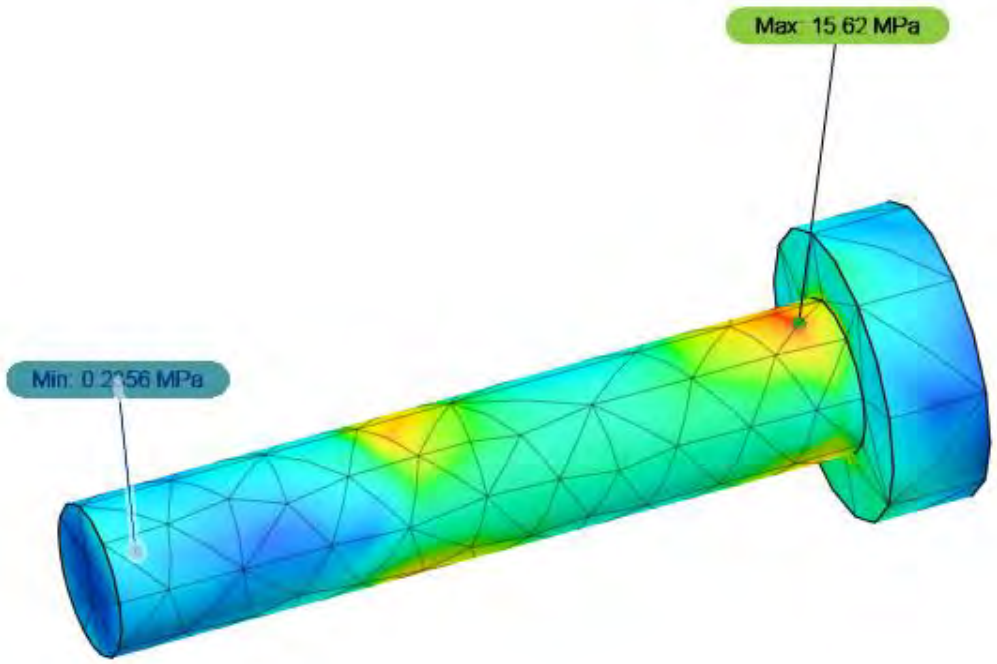


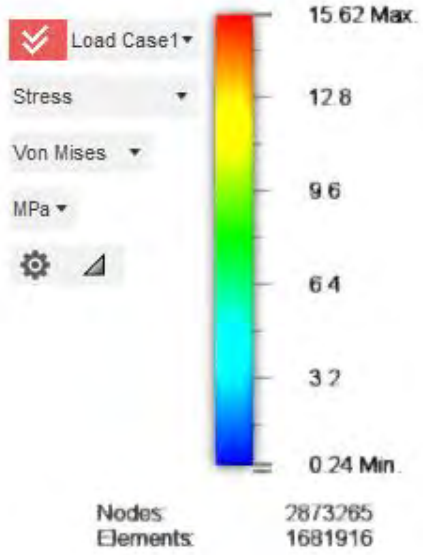
Analysis results

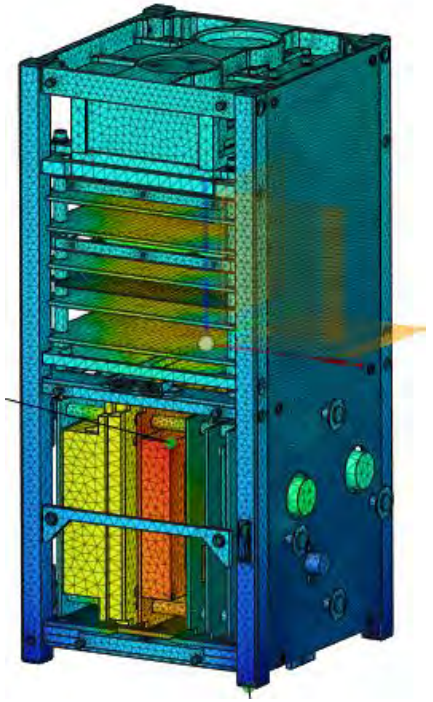
- Assessment

We check the stress value which is applied to each screw and frame. Then, compare with the ultimate strength of the material.

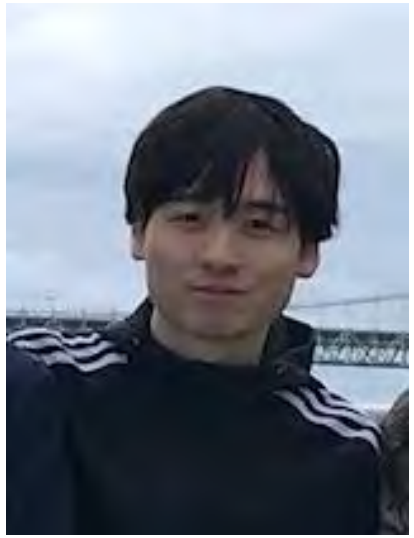
We calculate the margin of safety: these data are going to be reported.







Antenna design and deployment



By: Tomoya Iwase

Date: 8 April 2021

Antenna mechanism

This is the antenna mechanism that will be used in BIRDS-5. Figure 1 shows the antenna folded and tied with a thread.

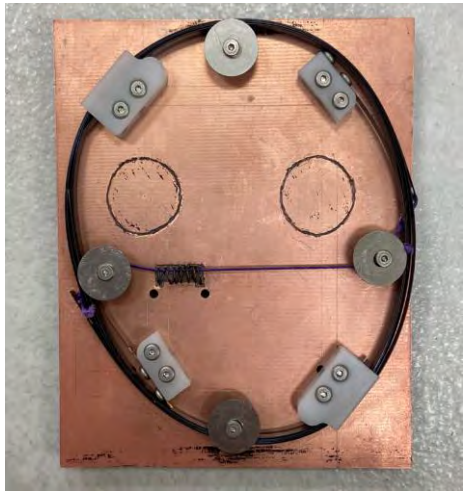


fig.1 Folded antenna

Figure 2 shows the deployed antenna. I will call this mechanism “windmill-shaped” type since it looks like a windmill. This decision was based on comparing two prototypes.

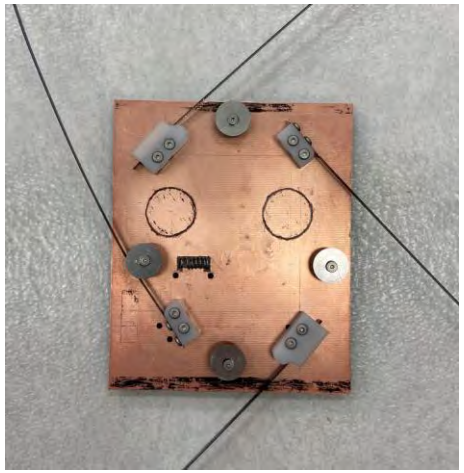


fig.2 Deployed antenna

Comparison of two prototypes

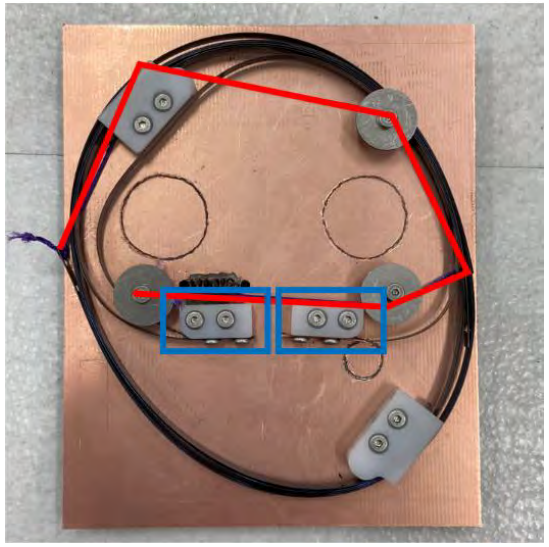


Fig.3 BIRDS-4 style

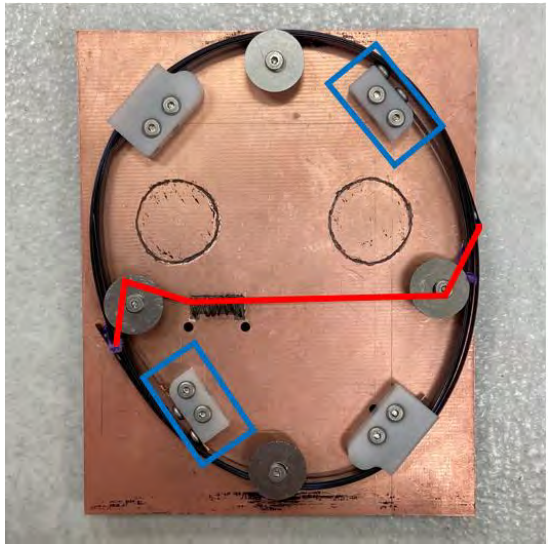


Fig.4 Windmill style

I did a comparison in deployment test between the mechanism used in BIRDS4 (fig.3) and the new windmill-shaped mechanism (fig.4).

The main changes from BIRDS-4 are the position of the UHF antenna holder (surrounded by blue boxes) and the way the antenna thread is fixed (indicated by the red lines).

Even at this point, the BIRDS-4 style shows that the parts are crowded near the nichrome wire.

Deployment test

The deployment test is performed by applying a voltage to a nichrome wire to generate heat, and cut the tied thread.

There are no problems to deploy both of them, but we can see that the UHF antenna on the right touched a holder when deploying using the BIRDS-4 style (fig.6). I think it is better to avoid touching parts like this unnecessarily.

I decided to use the windmill style mechanism in BIRDS-5, although each UHF antenna is better close to each other due to the impedance of circuit. It therefore requires to design the transmission line so that it can communicate without problems on BBM.

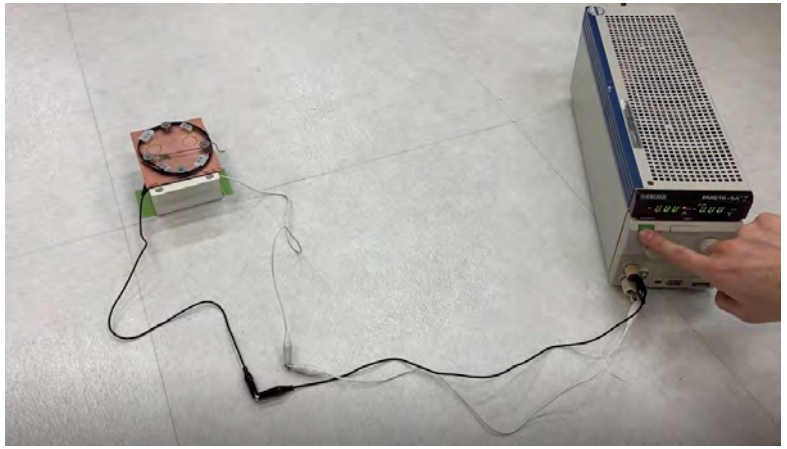


Fig.5 deployment test

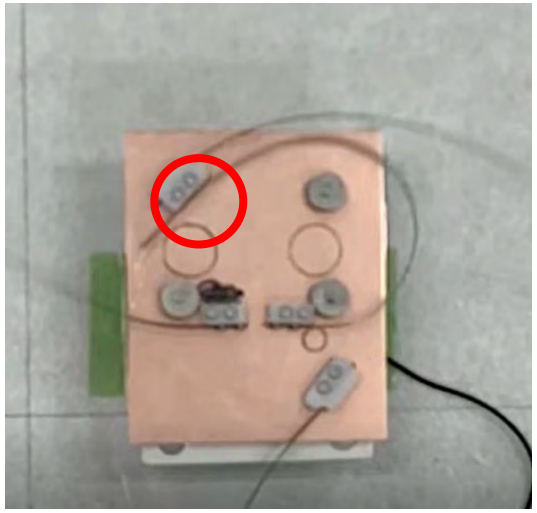


Fig.6 UHF antenna touching other parts

My Newly Discovered Japanese Dishes

By : Derrick TEBUSWEKE

Date: 14th April, 2021

When visiting Japan, you'll want to taste **Japanese cuisine**. There are many types of dishes and local specialties you can choose from.

Rice is a staple food in Japan and its called *gohan*, hence its influence on meal names; breakfast (*Asa gohan*), Lunch (*Hiru gohan*), Dinner (*bangohan*). First of all;

Learn Japanese Chopsticks (Hashi) Etiquette here: https://www.youtube.com/watch?v=WlROhvQEHqw

Some of the dishes I have tried include:

- Tendon Tempura (rice and sea food)

- Oden (Japanese one-pot dishes consisting of several ingredients such as boiled eggs)

- Okonomiyaki (Pan-fried dish that consists of butter and cabbage. Goes well with cheese topping)

- Cup noodles (Instant ramen or noodles. Good for students)

- Onsen Pudding (Found in souvenir restaurants around Onsens in Oita Prefecture).

- Beef steak.

- Bento. (*Combini* food, ideal if you are in a hurry).

- Miso soup (accompanied by other side and main dishes)

Dishes still on my bucket list:

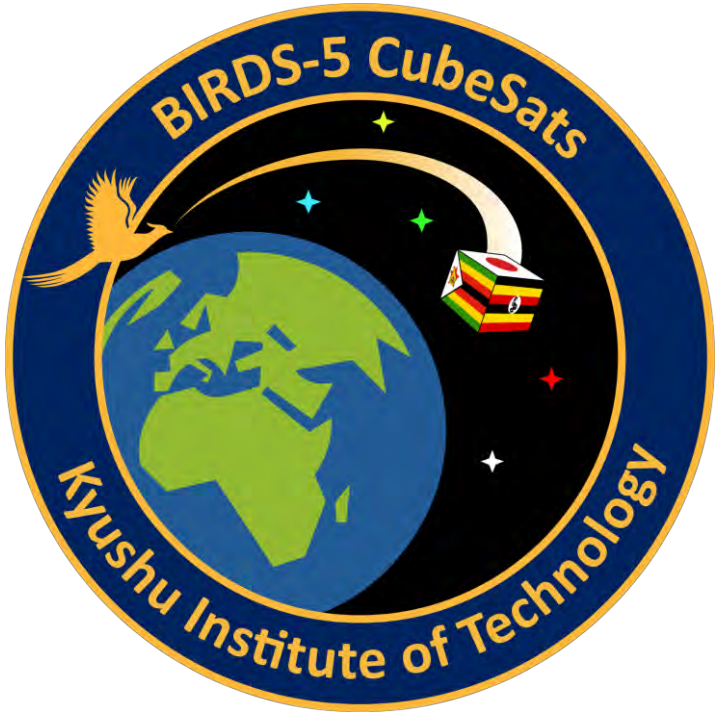
Any other Japanese dish I have not known yet.

- **Sushi**
- **Yakitori**
- **Onigiri**
- **Unagi**

END

End of BIRDS-5 reports for this month.

Thanks to Fahd for the compilation work.
- Editor



Return to Sri Lanka
And 7 day Quarantine in Avani Benthota Resort Sri Lanka

2021-04-11

By: Tharindu

Kitakyushu - Tokyo

It was a very emotional and hard to leave Kita-Kyushu after three and half years. I was a student for two years and I was very lucky and honored to became a staff member of ChoLab for one and half years. Because of Covid-19 situation. I could not meet all the members of ChoLab to say proper good bye.

Pooja, Aekjira and Rahima came to drop me to Kokura station. It was hard to say good bye to them.

I used shinkansen from Kokura to Tokyo even though it is taking more time than flight from Fukuoka to Tokyo because riding Japanese bullet trains was one of my childhood dream and every time I really enjoyed when I use Shinkansen to travel.

Tokyo to Colombo

After four hour and 20 min I arrived to Tokyo station at 3.15 PM. At Tokyo station Makiko help me to take Narita airport shuttle bus. She was in Tokyo to attend her sister's music consort.

With Makiko

Under Tokyo station dome

Sri Lankan Airline UL455 Airbus A330-300

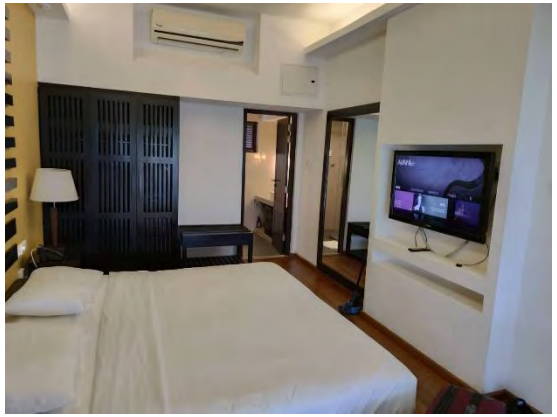
It was only about 50 passengers
(flight capacity is about 250 passengers)

It was very emotional when the plane was leaving Japan. I was saying to my self this is not the final good bye because I could not visit some of my dream destinations (Ex. Mount Fuji). I look out of the window and said Thank you land of dreams.

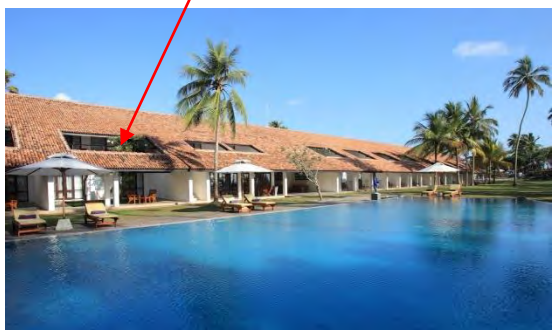
At Colombo

At 4.30 am I arrived to Bandaranaike International Airport, Colombo. Airport environment was completely different because of covid-19 situation after immigration and other checks Sri Lankan Army took over the controlling of passengers and they are sent to hotels for 7 day quarantine period. Because it was early in the morning I did not know where I was going until the Army bus reached the hotel. Luckily it was a very beautiful hotel near sea.

Avani Bentota Resort, Bentota



My room was here

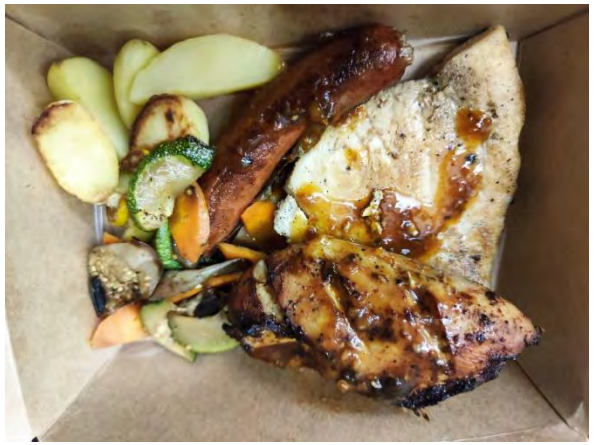


Evening view from my room window

Food

END OF REPORT FROM THARINDU

After long time I could enjoy Sri Lankan food. They were very delicious.



Sausages, Fried chicken, Tuna, Potato, pickle, carrot

Rice, chicken, pumping, gotu kola, Green beans, papadam

Rice, chili paste, squid, kankun, carrot salad

Rice, dambala, daal, shrimp, fried fish, radish

Fried tuna, mashed potato, rice, green beans, mushroom

Fried chicken, boiled egg, noodles with vegetables, tomato+onion

Rice, rathu ala, gotu kola, chicken, fried chili, cassava

Rice, shrimp, cheesy tuna, carrot + green beans salad, chili paste

End of this **BIRDS Project Newsletter**

(ISSN 2433-8818)

Issue Number Sixty-Three

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.