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. 59
(21 Dec. 2020)

Edited by:
G. Maeda
革新的宇宙利用実証ラボラトリー
Laboratory of Lean Satellite Enterprises and In-Orbit Experiments (**La SEINE**)
Kyushu Institute of Technology (Kyutech)
Kitakyushu, Japan

Archive website: http://birds1.birds-project.com/newsletter.html
All back issues are archived at this website.
Acknowledgment of support: This newsletter is supported, in part, by *JSPS Core-to-Core Program, B. Asia-Africa Science Platforms.*

La SEINE

SEIC Space Engineering International Course

All back issues of this newsletter can be easily downloaded.

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

Table of Sections

Continued on the next page

From Paraguay **The Guest Box**

Yguazú is a city of Paraguay, located in the Department of Alto Paraná, near the river of the same name. It was founded by Japanese immigrants in August 1961. It is inhabited in a large proportion by Japanese settlers, but you can also find Paraguayans, Brazilians, Germans, Swiss and French, who preserve their languages and traditions. So it has a population very rich in culture. **CONTINUED IN SECTION 13.**

- Ariel Manabe, new SDG SEIC student from Paraguay

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

End of Table of Sections

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

The New Three Major Night Views of Japan are:

一. Views of Kitakyushu from Mount Sarakura (皿倉山), a mountain in Kitakyūshū Quasi-National Park, which is at the city of Kitakyushu in Fukuoka Prefecture, Kyūshū. **(Shown above)**

二. Views of Nara from Mount Wakakusa (若草山), a mountain located in the east of Nara Park.

三. Views of Kōfu Basin from Yamanashi Prefecture Fuefukigawa Fruit Park (山梨県笛吹川フルーツ公園), a city park in Yamanashi, Yamanashi Prefecture.

JSPS Reminder

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

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

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

01. Astronaut Dr. Wakata scheduled to return to the ISS

若田さん、古川さんISSへ

22、23年頃 米民間船で

米の民間宇宙船 野口さん「最高」

―ISSで記者会見

米民間宇宙船の乗り心地などを語る野口聡一飛行士（後列右）＝NASAテレビから

若田光一さん Dr. Wakata

古川聡さん

Dr. Wakata is a great friend of BIRDS, SEIC, and of PNST – see the next page

◀若田・古川さん宇宙へ 6
■ポンペオ氏入植地訪問 3
■広州モーターショー 3
■コロナ禍 ALT不足 6
■2人死亡 放火の疑い 7

THE YOMIURI SHIMBUN

夕刊 讀賣新聞

2020年（令和2年）11月20日 金曜日

Published in this newspaper on 20 Nov. 2020

Nakamura Memorial Hall of Kyutech

Dr Wakata participated in the

2017 PNST Symposium

Post-graduate study on Nano-Satellite Technologies

Day 1 **4 December 2017**

Day 2 **5 December 2017**

Venue: Tobata Campus, Kyutech, Kitakyushu City, Japan

Many students of BIRDS/SEIC students are on PNST scholarships.

Dr Wakata and Jesus (Colombia)

TOPIC: How do we apply the lessons of PNST for more and better space engineering capacity building in the future?

Panel discussion led by Prof. Cho.

ABOVE:

Dr Wakata gave a keynote lecture entitled: **"Maximizing the Outcome of the ISS and "Kibo" - Innovative launch opportunity for Micro/Nano-satellite by using one and only function on Kibo/ISS"**

Dr. Koichi Wakata
(ISS Program Manager / Astronaut, Human Space Technology Directorate, JAXA)

Read the full story here:
Pages 16-28, Issue #23, *BIRDS Project Newsletter.*

02. Applications are now being accepted for UNOOSA/Kyutech PNST

A full scholarship for six graduate students

Cont'd on the next page

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

United Nations/Japan Long-term Fellowship Programme on Nano-Satellite Technologies Hosted by Kyushu Institute of Technology Japan

Post-graduate study on Nano-Satellite Technologies

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

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

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

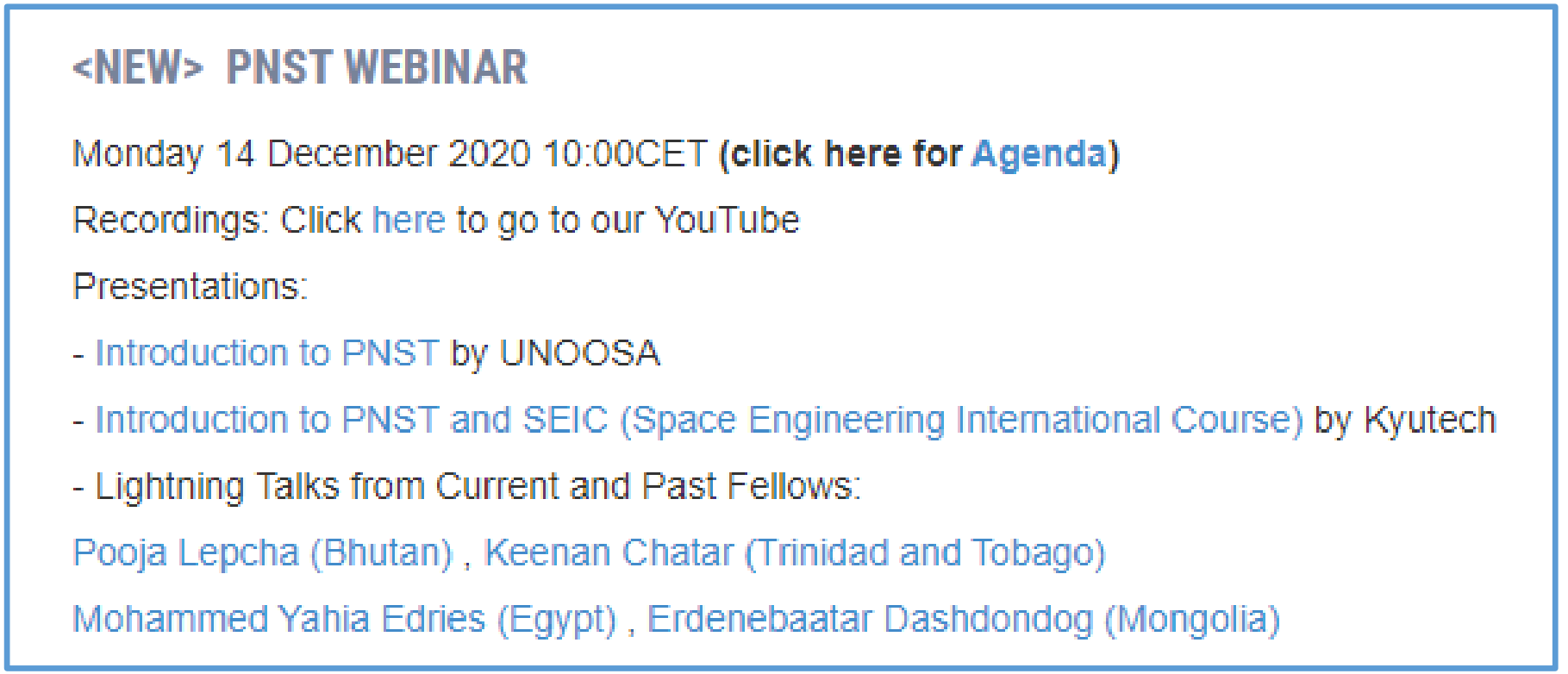
If you are an engineer under age 35 living in a non-space-faring nation and you are *passionate* about space, then you have a good chance at PNST; you should apply.

To help explain and promote PNST, UNOOSA organized a PNST Webinar on 14 Dec 2020. You can view its recording and all of the presentation files.

UNITED NATIONS
Office for Outer Space Affairs

SPACE4SDGS

BRINGING THE BENEFITS OF SPACE TO HUMANKIND



<NEW> PNST WEBINAR

Monday 14 December 2020 10:00CET **(click here for Agenda)**

Recordings: Click here to go to our YouTube

Presentations:

- Introduction to PNST by UNOOSA
- Introduction to PNST and SEIC (Space Engineering International Course) by Kyutech
- Lightning Talks from Current and Past Fellows:

Pooja Lepcha (Bhutan) , Keenan Chatar (Trinidad and Tobago)

Mohammed Yahia Edries (Egypt) , Erdenebaatar Dashdondog (Mongolia)

← This is just a screen shot. To access all of these links, go to the PNST Website (shown below).

The PNST Website: https://www.unoosa.org/oosa/en/ourwork/psa/bsti/fellowships.html

UNOOSA interviewed a PNST student recently

← Pooja Lepcha, currently a PhD student on nanosatellite technologies at the Kyushu Institute of Technology in Japan, shares her experience and aspirations -- *"Being at Kyutech is like having the entire world in our lab" .*

I am Pooja Lepcha from Bhutan. I am currently doing my PhD in electrical and space systems engineering at Kyutech. Until I started my master's degree at Kyutech, I spent most of my life in Bhutan, where I did my bachelor in Electrical Engineering. While being a student, I am also employed by the Bhutan government in the Ministry of Information and communication, which hosts the division working on space in our country.

Pooja bonding with her Kyutech lab mates, who come from all over the world, while celebrating Hanami, the cherry blossom festival in Japan

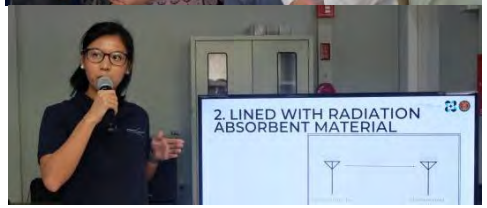
Above: The flight model of Bhutan's first satellite, **BHUTAN-1.**

See the entire interview:

https://www.unoosa.org/documents/pdf/psa/bsti/fellowship/2021/Interview_with_Pooja_Lepcha_PNST_Kyutech-_30_Nov_FINAL.pdf

03. A reminder about ULyS3ES of UPD and DOST

ULyS3ES = University Laboratory for Small Satellites and Space Engineering Systems
UPD = University of Philippines Diliman
DOST = Department of Science and Technology



Note: UPD is a member of both BIRDS-2 and BIRDS-4 Projects. Last year, on its Diliman campus, it opened a laboratory dedicated to small satellites and space engineering. And it is a marvelous facility. I received a tour just before it was opened.

Last year the inauguration of ULyS3ES took place at the University of the Philippines Diliman Electrical and Electronics Engineering Institute (UP-EEEI).

The event was attended by key officials from the Department of Science and Technology (DOST) and University of the Philippines (UP).

View the 2-minute YouTube video mentioned on the next page.

← Prof Marciano (Director of the Phil Space Agency) says: "[engineers] can now have a reason to come back to the Philippines."

UP and DOST inaugurate ULyS3ES facilities https://www.youtube.com/watch?v=xqd7WczU2YE

04. Rocket Lab puts up 30 small sats successfully

NOVEMBER 22, 2020

SPACEFLIGHT NOW

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BREAKING NEWS > [November 21, 2020] Photos: Sentinel-6 Michael Freilich encapsulated for launch

Rocket Lab recovers booster after launch with 30 small satellites

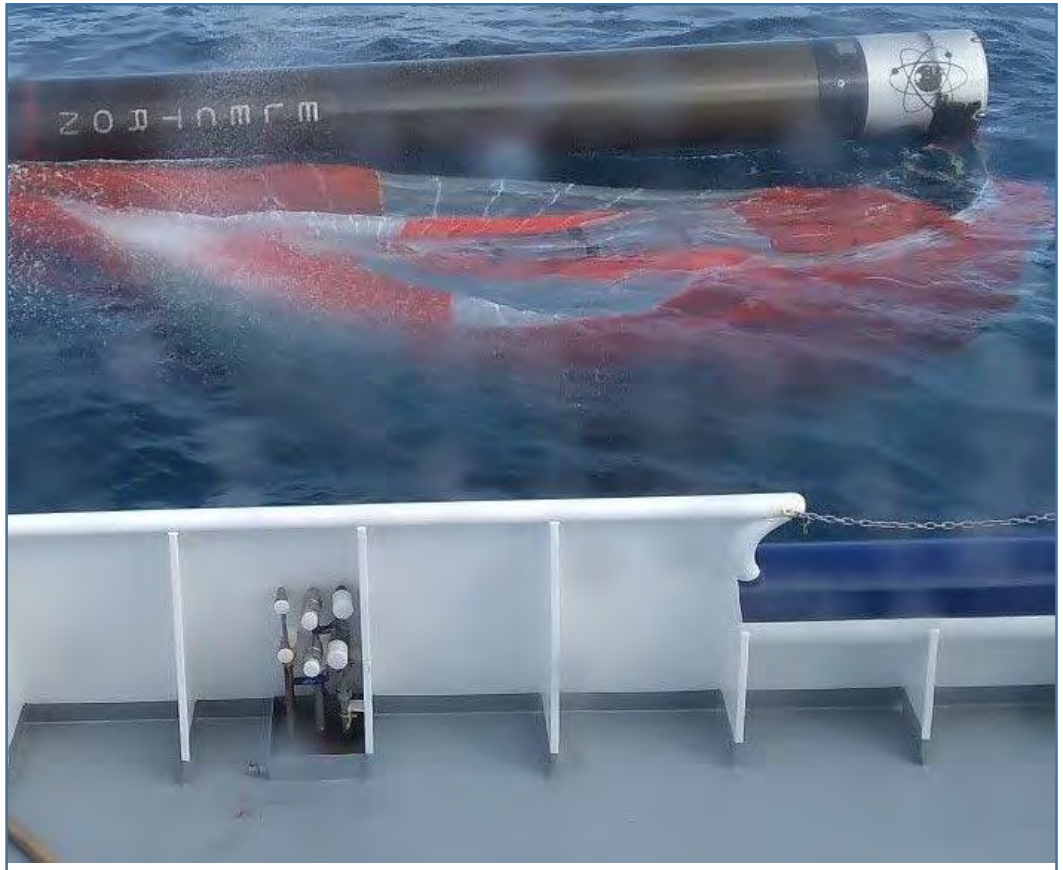
November 20, 2020 Stephen Clark

Rocket Lab says the first stage of its Electron launcher splashed down under parachute in the Pacific Ocean off New Zealand after firing into space with 30 small satellites Thursday, becoming only the second private company to return an orbital-class booster to Earth intact.

Suspended under a circular parachute, the carbon composite booster stage descended to a splashdown a few hundred miles downrange from Rocket Lab's launch base in New Zealand, according to Rocket Lab.

A recovery team stationed in the Pacific Ocean moved in to secure the booster before hoisting it onto a vessel for the journey back to New Zealand for inspections.

The successful splashdown of the Electron's first stage moved California-based Rocket Lab closer to reusing rocket boosters, which the company says will allow it to launch missions at a faster cadence, and potentially cut costs.



The Electron first stage is seen in the Pacific Ocean in this image shared by Rocket Lab founder and CEO Peter Beck on Twitter.
Credit: Rocket Lab via Peter Beck

Continued on the next page

This Rocket Lab rocket (Electron) successfully placed 30 small sats into orbit

While the first stage parachuted into the Pacific Ocean, the Electron's second stage deployed the mission's 30 payloads and kick stage into a preliminary transfer orbit. Within an hour of launch, the kick stage reignited to place the small payloads into a near-circular 310-mile-high (500-kilometer) orbit.

Two of the spacecraft on the Electron launch were built by Millennium Space Systems, a subsidiary of Boeing, for a mission named DragRacer to test a drag-inducing device that could help small satellites in low Earth orbit naturally decay, or re-enter the atmosphere.

One satellite — named Alchemy — will extend a 230-foot-long (70-meter) electrically conductive tether, a device designed to increase the surface area of the spacecraft, allowing it to succumb to aerodynamic drag, re-enter the atmosphere, and burn up.

Both DragRacer spacecraft are identical, except that one carries the tether and the other — named Augury — does not.

According to preflight predictions, the satellite with the tether could re-enter the atmosphere within 45 days. The spacecraft without the tether — the control for the experiment — is expected to remain in orbit for around seven years, according to mission team members.

The device affixed to DragRacer's Alchemy satellite is called a Terminator Tape. Developed by Tethers Unlimited, the tape measures just a few inches wide, but it can spool out to lengths of hundreds of feet.

The DragRacer experiment is a purely commercial experiment to quantify the effectiveness of the Terminator Tape technology, which Millennium and Tethers Unlimited say is a more reliable, lower cost, and less complex alternative to other deorbit methods, such as drag sails or propulsive thrusters.

"This scientific method experiment will demonstrate Millennium's ability to field and fly a low-cost and straightforward orbital debris mitigation solution that doesn't require added mass, volume, cost and complexity of propulsion system to deorbit a satellite in low Earth orbit," said Stan Dubyn, founder and CEO of Millennium Space Systems, in a press release.

The two DragRacer satellites have a combined weight of around 55 pounds, or 25 kilograms, according to TriSept Corp., a partner on the DragRacer mission overseeing the integration of the satellites on the Rocket Lab launcher.

Ground-based radars will track the changing orbits of both DragRacer spacecraft to measure how they decay differently.

Rocket Lab's Electron launcher blasts off from New Zealand with 30 small satellites. Credit: Rocket Lab

"The space community understands tether systems can expedite re-entry, but this is our first opportunity to truly quantify performance directly and more effectively calibrate models developed over the last 50 years," said Robert Hoyt, founder and CEO of Tethers Unlimited. "Predictions suggest the tethered spacecraft will deorbit in approximately 45 days, while the untethered spacecraft remains in orbit for approximately 7 to 9 years."

Tethers Unlimited's Terminator Tape technology has flown before. The company says the tether module — which attaches on the exterior of a host spacecraft — weighs about 2 pounds and is about the size of a notebook, and is suitable for a range of satellite sizes.

The Prox-1 microsatellite developed by students at Georgia Tech deployed 230-foot-long Terminator Tape last year. Tethers Unlimited said tracking of the spacecraft showed its orbit decaying 24 times faster after extending the tether.

Continued on the next page

Flying two identical satellites on the DragRacer mission will allow engineers to better characterize the performance of the tether technology.

“The mission is completely about the demonstration,” said Jason Armstrong, director of TriSept’s launch and integration services, in an interview last year with Spaceflight Now. “So immediately upon separation from the launch vehicle, the two halves of the spacecraft will come apart from each other, and then we can deploy the tether on one half of the spacecraft and get immediate results.”

Armstrong said the benefit of the Terminator Tape over other deorbit solutions is its smaller volume and mass.

“It’s much less complex as far as the capabilities you need to have for actuating and deploying the system,” Armstrong said. “On-board, all we need to have is a small timer with a little battery mechanism. That’s very attractive (to satellite operators) because you’re not introducing risk or any high complexity systems that have to talk to your flight computer.”

Other payloads launched on Rocket Lab’s mission Thursday night include two briefcase-sized CubeSats for a French startup named UnseenLabs. Built by the Danish smallsat manufacturer GomSpace, the Bro-2 and Bro-3 satellites are the second and third launched for UnseenLabs.

The French company plans to field a constellation of 20 to 25 satellites over the next five years for maritime surveillance. UnseenLabs says its fleet of nanosatellites will be able to locate and identify ships around the world, providing tracking services for maritime operators and helping security forces watch for pirates and smugglers.

Swarm Technologies had 24 of its tiny SpaceBEE satellites, each about the size of a slice of bread, on the Electron rocket. The “BEE” in SpaceBEE stands for Basic Electronic Element.

Swarm is developing a low-data-rate satellite communications fleet the company says could be used by connected cars, remote environmental sensors, industrial farming operations, transportation, smart meters, and for text messaging in rural areas outside the range of terrestrial networks.

New Zealand’s first satellite designed and built by university satellites also rode into orbit on the Electron rocket. Designed and built at the University of Auckland, the CubeSat is named Te Waka Āmiorangi o Aotearoa, which translates in English to New Zealand Satellite Vessel. It’s also known as APSS-1, using the acronym for the Auckland Program for Space Systems.

The spacecraft carries an instrument to measure electrical disturbances in the ionosphere to investigate how they might be linked to earthquakes.

Rocket Lab launched the APSS 1 satellite at no charge, according to the University of Auckland.

A “mass simulator” in the form of Gnome Chompski, an item from the “Half-Life” video game, will remain attacked to the Electron rocket’s kick stage after it releases the mission’s other payloads. The space-bound gnome was created for Gabe Newell, founder of the video game company Valve.

“Manufactured with support from multi-award-winning design studio Weta Workshop, the unique space component is additively manufactured from titanium and printed in the shape of Half-Life gaming icon Gnome Chompski,” Rocket Lab writes in the press kit for Thursday’s mission. “The mission serves as an homage to the innovation and creativity of gamers worldwide, and also aims to test and qualify a novel 3D printing technique that could be employed for future spacecraft components. The 150 mm gnome will remain attached to Electron’s kick stage and will de-orbit with it when the stage burns up on re-entry to the Earth’s atmosphere.

Read the full article here:

https://spaceflightnow.com/2020/11/20/rocket-lab-recovers-booster-after-launch-with-30-small-satellites/#:~:text=Rocket%20Lab%20says%20the%20first,class%20booster%20to%20Earth%20intact.

OLAYINKA'S WORLD

COLUMN NO 22

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

INTERNATIONAL OBSERVE THE MOON NIGHT 2020

International Observe the Moon Night is a time to come together with fellow Moon enthusiasts and curious people worldwide. Everyone on Earth is invited to learn about lunar science and exploration, take part in celestial observations, and honour cultural and personal connections to the Moon during this time. International Observe the Moon Night occurs annually in September or October, when the Moon is around first quarter, a great phase for evening observing. Furthermore, a first-quarter Moon offers excellent viewing opportunities along the terminator (the line between night and day), where shadows enhance the Moon's cratered landscape.

It was in this light that kids gathered at the Internally Displaced People's (IDP) camp to mark this year's event on Saturday, 26th September, 2020. AWB Nigeria had set up telescopes on the camp as early as 5pm when the first glimpse of the moon was sighted. The kids were all excited to look through the telescopes as they wear their face masks considering the Covid-19 pandemic season we are in. Even though the experience was short lived as the cloud covers soon took over the entire evening sky. Nonetheless, the experience left the kids in awe and with so much excitement and curiosity about our nearest celestial neighbour, the Moon!

Kids at the Internally Displaced People's camp observing the moon to mark the *International Observe the Moon Night 2020.*

06. 60th Kyutech Student Festival

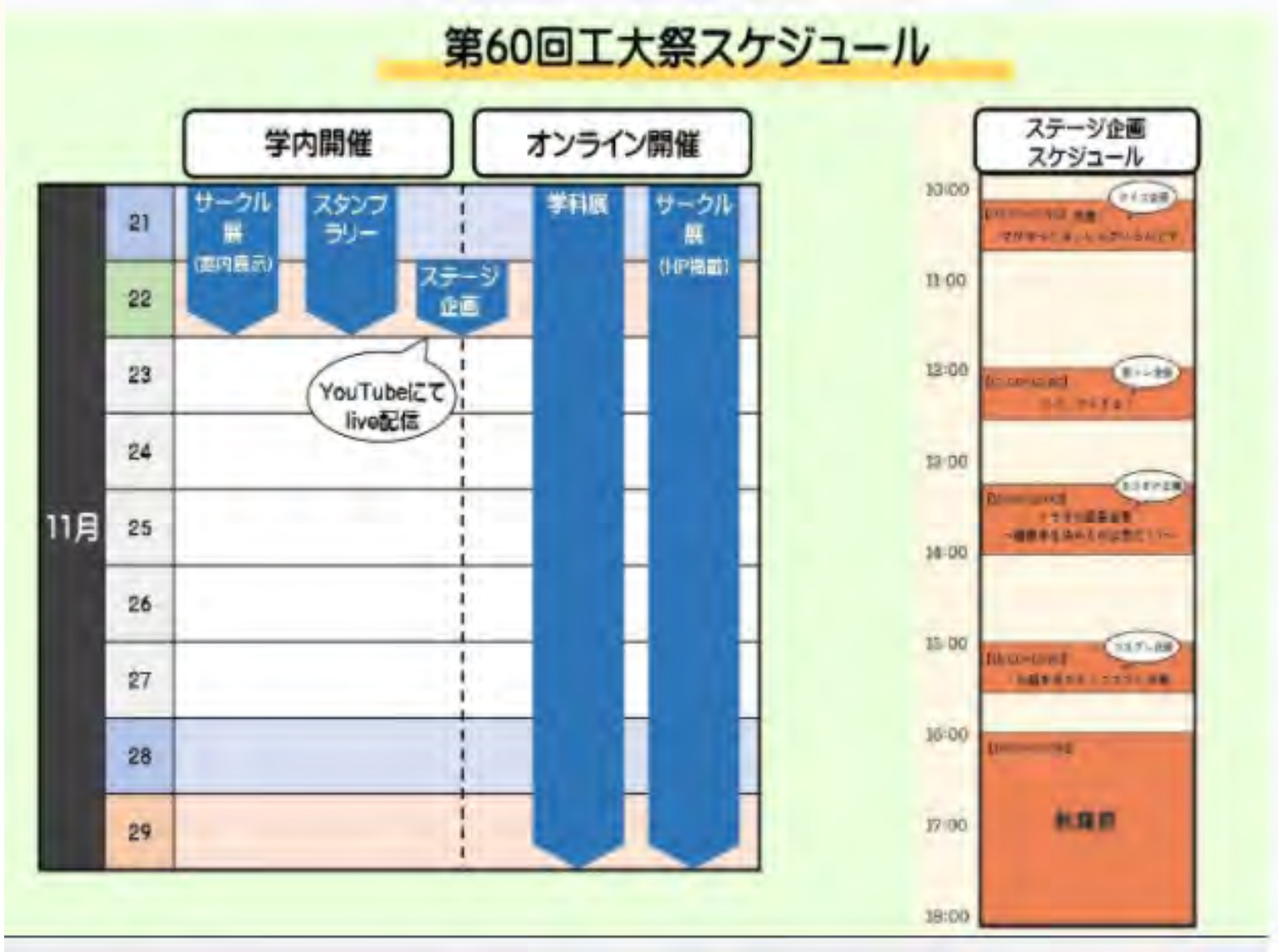
第６０回工大祭テーマ

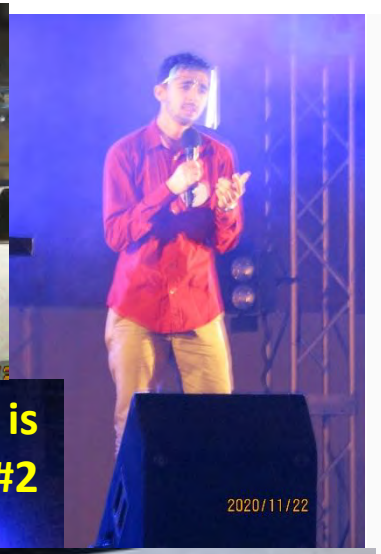
Go Kyutech Festival

～ Zero から作る工大祭～

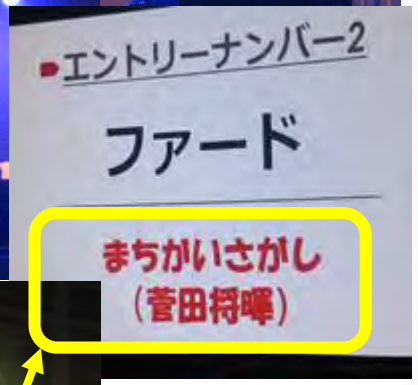
Kyutech Student Festival
Of
22 Nov. 2020
(Tobata Campus Edition)

Homepage:
http://kit-fes-tobata.com/





Fahd is Entry #2



Fahd (BIRDS-5, Morocco) belts out the song shown above

ステージ企画 ← Plans for the stage (gymnasium)

・クイズ企画（11月22日 10:10~）

今年はコロナ禍で学校に来る機会も少なく、目立ちたくても目立てなかった1年生のために人気者になれる機会を用意しました！どんな1年生がいるのか要チェック！

・筋トレ企画（11月22日 12:00~）

皆さん、最近運動してますか？リモート作業で運動不足になりがちではありませんか？そんなあなたのために屋内でできる運動「筋トレ」をミニゲーム感覚で行います！バラエティー感覚でお楽しみください！

・カラオケ企画（11月22日 13:15~） **Karaoke Competition**

工大祭毎年恒例のカラオケ大会！今年度はオンライン配信ということで、機械での採点に加え、オンラインでお楽しみの皆さんにも投票を行います！ぜひご覧ください！

・コスプレ企画（11月22日 15:00~）

今年初のコスプレ企画！一人がお題に沿ったコスプレをし、もう一人がそのコスプレを見てお題を当てる二人一組で行う競技となっています！今までにない新たな企画をその目で見よ！

・秋輝祭（11月22日 16:00~）

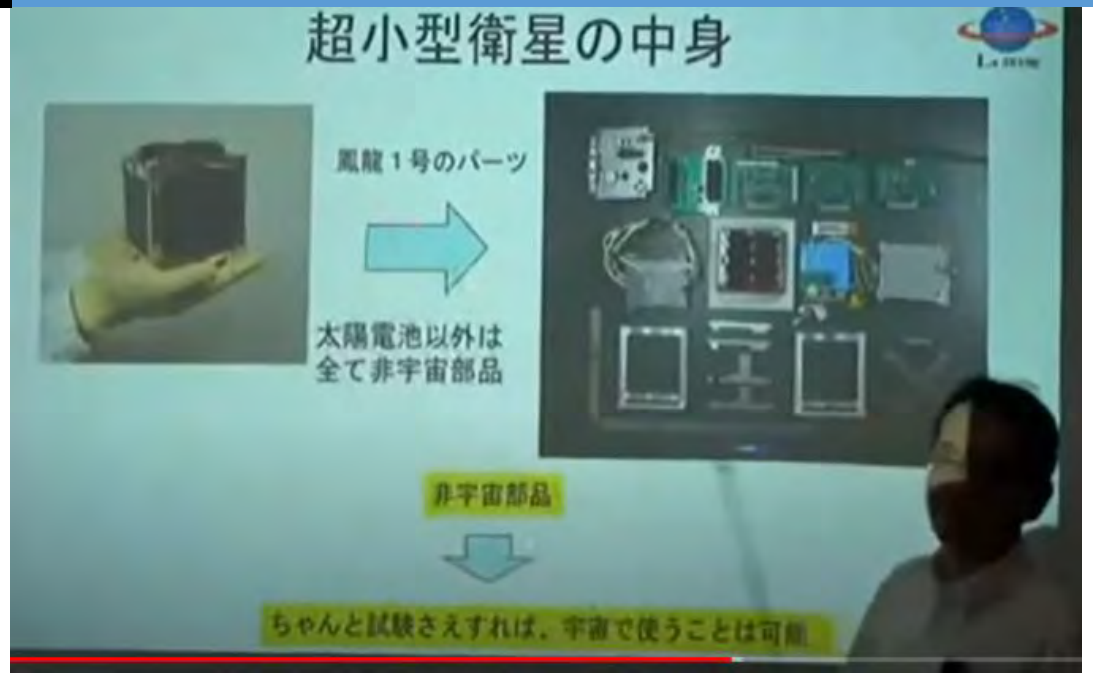
工大祭の締めくくりとなる秋輝祭！本学サークル・部によるパフォーマンスだけでなく、豪華景品の当たるキーワード企画も行います！最高の瞬間を見逃すな！

CONTINUED ON THE NEXT PAGE

Fahd is from 03:50:00 to 03:55:17

カラオケ大会

YOU CAN VIEW THE WHOLE THING ON YOUTUBE:
https://www.youtube.com/watch?v=priAwE4Fyx4&feature=youtu.be

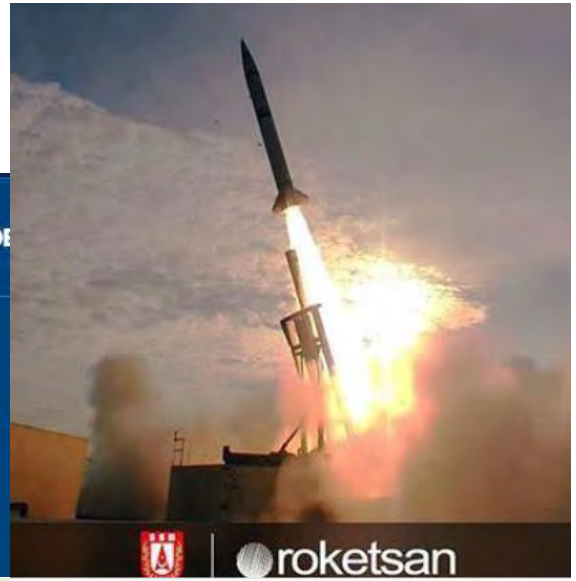


Prof Cho is from 04:49:24 to 05:19:13

Space education at Kyutech

07. Rocket news from Turkey

Turkey is conducting an active program of testing sounding rockets:
https://www.youtube.com/watch?v=ejhdoTiEL5E&ab_channel=RoketsanA.%C5%9E



. . . with the goal of putting micro satellites into 400-km-high orbits by 2025:
https://www.aa.com.tr/en/turkey/turkey-tests-indigenous-liquid-fueled-rocket-engine/2043362

08. Highlighting Japan (Nov 2020 issue): The Japanese and Rice

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E-mail Newsletter "Highlighting JAPAN"

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

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No. 150 (November 2020)

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November 2020 edition of Highlighting Japan is now available. This month's issue covers 'The Japanese and Rice': In Japan, rice not only provides nourishments, it also defines landscapes, provides employment, and informs cultural practices and various values. In this month's Feature, we take a look at a few examples of Japanese interactions with rice: https://www.gov-online.go.jp/eng/publicity/book/hlj/20201101.html

09. To all stakeholders: New satellites need to be registered with UNOOSA

If you are putting a satellite into space, you are required to register it with UNOOSA. Download this document and peruse the first few pages.

http://www.unoosa.org/pdf/limited/c2/AC105_C2_2015_CRP17E.pdf

10. You can view all of 2020 APRSAF through a web link

APRSAF
ASIA-PACIFIC REGIONAL SPACE AGENCY FORUM

Check out ← their comments at the link below.

2020 APRSAF was conducted online due to COVID-19. It can all be viewed here:
https://www.aprsaf.org/annual_meetings/online2020/meeting_details.php

OTHER NEWS AND UPDATES FROM APRSAF

Subject: APRSAF News & Updates
From: APRSAF Secretariat <aprsaf_newsmail@aprsaf.org>
Date: 2020/12/14 16:25

1. SAFE Virtual Workshop and ALOS-2 Seminar to be Held in January 2021

The SAFE secretariat and GISTDA will jointly organize the SAFE Virtual Workshop being held on 28 January 2021, and the ALOS-2 Seminar on 29 January. First announcement is here:
https://www.eorc.jaxa.jp/SAFE/news_event/2020/virtual_ws/

2. Feedback on APRSAF Online 2020

To further improve APRSAF's activities, we would appreciate your cooperation in completing the questionnaire on APRSAF Online 2020 at the URL below. It takes just a few minutes.
https://forms.gle/P6FcBwCQNyGNnboM7

3. Comments Welcomed on Working Groups Restructuring and APRSAF Award

At APRSAF Online 2020, the APRSAF Executive Committee proposed a restructuring of Working Groups and the commencement of the APRSAF Award. We welcome your comments regarding these proposals until 25 December 2020.
Please access
https://www.aprsaf.org/annual_meetings/online2020/excom.php for details of the proposals along with related documents.

APRSAF Secretariat
secretariat@aprsaf.org
Web: http://www.aprsaf.org/

11. Dr Loren Chang (NCU in Taiwan) was our speaker for SEIC Guest Lecture (30 Nov.)

Title:

IDEASSat: A 3U CubeSat for Ionospheric Science and Capacity Building

國立中央大學
National Central University

Abstract

The recent expansion in satellite communications for Beyond 5G networks has greatly increased the need for understanding ionospheric space weather and its effects on satellite communications and navigation. The Ionospheric Dynamics Exploration and Attitude Subsystem Satellite (IDEASSat / INSPIRESat-2) is a three-unit (U) CubeSat developed with the objective of providing in-situ measurements of the Earth's ionosphere in order to quantify both global scale ionospheric variability and small scale irregularities. The science payload is the Compact Ionospheric Probe (CIP) - an all in one in-situ plasma sensor developed at Taiwan National Central University (NCU), which is the miniaturized version of the larger Advanced Ionospheric Probe (AIP) that is carried and operational aboard the 450 kg FORMOSAT-5 spacecraft.

CONTINUED ON THE NEXT PAGE

Dr. Loren gave his permission to make available the video recording of his lecture. Here it is but *it is only for the readers of this newsletter:*

https://www.dropbox.com/s/mmglugojq8pp14f/SEIC%20Guest%20Lecture%20-%20Dr%20Loren%20Chang%3B%2030%20NOV%202020.mp4?dl=0

ABSTRACT … continued from the previous page
The spacecraft has been developed by NCU in partnership with the International Satellite Program in Research and Education (INSPIRE) consortium, and is funded by the Taiwan National Space Organization (NSPO), Ministry of Science and Technology, and Ministry of Education as part of the first national effort to encourage small satellite development at Taiwan universities.

IDEASSat will work in conjunction with FORMOSAT-5, as well as the INSPIRESat-1 and ARCADE/INSPIRESat-4 small satellites to provide ionospheric observations spanning different altitudes and local times. IDEASSat will be launched in January 2021. In this report, we describe the IDEASSat mission and spacecraft design, the potential for combined multi-satellite observations, as well as unique lessons learned as part of the development process for NCU's first small satellite. **End of Abstract**

BIO

Dr. Loren Chang is a Distinguished Professor at the Department of Space Science and Engineering at National Central University (NCU) in Taiwan. Dr. Chang conducts research on the Earth's upper atmosphere and its role in space weather, analysis of satellite data from the COSMIC/FORMOSAT-3 and TIMED missions, **and serves as the Taiwan lead for the International Satellite Program in Research and Education (*INSPIRE*) consortium**.

Dr. Chang is currently leading the development of the IDEASSat (Ionosphere Dynamics Explorer and Attitude Subsystem Satellite)/INSPIRESat-2 spacecraft, as well as the SCION-X (SCintillation and IONosphere Network eXtended) mission. Dr. Chang is working to establish spacecraft design and operations capacity, as well as an academic program focused on astronautics at NCU. Prior to joining NCU, Dr. Chang served as a postdoc at National Cheng Kung University and Boston College. Dr. Chang received his PhD in Aerospace Engineering Sciences from the University of Colorado at Boulder in 2010 specializing in mesosphere and lower thermospheric dynamics.

12. Send offs for Mr. Ariel Manabe – Kyutech's first JICA SDG scholarship recipient

Two photos received from Dr Jorge Kurita on 01-DEC-2020.

Picture 1: Taken on Wed Nov. 25th, from left to right, Dr. Jorge Kurita (AEP Director of Planning and Management), Mr. Ariel Manabe (JICA Scholarship Recipient), Cnel. Liduvino Vielman (AEP President), Ms. Hebe Romero (AEP Director of Legal and Int'l Affairs), and Mr. Alejandro Roman (Director of Aerospace Development).

Mr. Ariel Manabe departs Paraguay for Japan – Thank You JICA

Picture 2: Taken on Fri Nov. 27th, from left to right, Mr. Federico Bajac (Senior Year Aeronautical Engineering Undergrad Student), Mr. Eladio Ferrer (AEP Director of Statistics and Evaluation), Mr. Cristian Rivas (Junior Year Aeronautical Engineering Undergrad Student), Prof. Teodoro Salas (Dean of the Faculty of Polytechnic – UNA), Dr. Jorge Kurita (Aeronautics and Astronautics Research Group Leader at FPUNA), Mr. Ariel Manabe (JICA Scholarship Recipient), Mr. Rodolfo Vazquez (Head of the Aeronautical Engineering Department at FPUNA).

13. More about the Japan-based Yguazu colony in Paraguay – continued from Page 2

Yguazu Colony

by Ariel Manabe, new SEIC student from Paraguay
6 December 2020

Front

Back

Yguazu comes from a combinations of words in *Guaraní (Second official language of Paraguay),* y (water) and guasu (big).

It is a city located near the river with the same name (Department of Alto Paraná). It was founded on August 22nd, 1961 complying with a migration agreement between Japan and Paraguay, it was first administered by the Japan International Cooperation Agency, JICA.

https://www.youtube.com/watch?v=LS9_GDNMSR8&t=816s

Japanese culture is so ingrained that it is common to find typical Japanese food in combination with typical Paraguayan food.

There are many places to visit, for example, the **Asahi** (a Japanese word that means "morning sun“) recreational park, ideal for those who love nature.

Also, you can visit The Immigrant Museum, which is one of the most emblematic sites, here you can find vestiges of what the Yguazu city was during the colonial era.

17-min. video about Yguazu → https://www.youtube.com/watch?v=LS9_GDNMSR8&t=816s

14. "Japan’s Space Startup Market Blooms"

日本の宇宙スタートアップ市場が開花

Japan's Space Startup Market Blooms

by RACHEL JEWETT

THIS IMAGE IS FROM THE LINK

The number of non-U.S. investors in the space industry is rising. Data provided from Bryce’s 2020 Start-Up Space report. Read the article:
http://interactive.satellitetoday.com/via/november-2020/japans-space-startup-market-blooms/

同じもの日本語で
http://interactive.satellitetoday.com/via/november-2020/translated-japans-space-starup-market-blooms/

15. The auto translation feature of YouTube has become amazingly good -- you should try it

Did you know that the auto translation feature of YouTube is now amazingly good? Just try it.

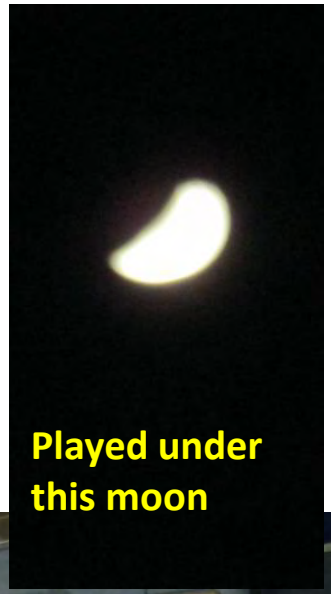
Pick your favorite video in any language. Click on the controls at the bottom of the screen. YT will translate in real time the audio track (for example, spoken Korean) into subtitles 字幕. What languages are supported? Nearly all major languages around the world. The technology is stunning.

THIS IMAGE IS FROM THE LINK BELOW

HOW TO EASILY TRANSLATE YOUTUBE VIDEOS IN NEW LANGUAGES
https://ignitevisibility.com/how-to-easily-translate-youtube-videos-in-new-languages/

16. SEIC soccer night of 21 Nov 2020

Playing under the lights during 19:00-20:00 on 21 Nov. 2020



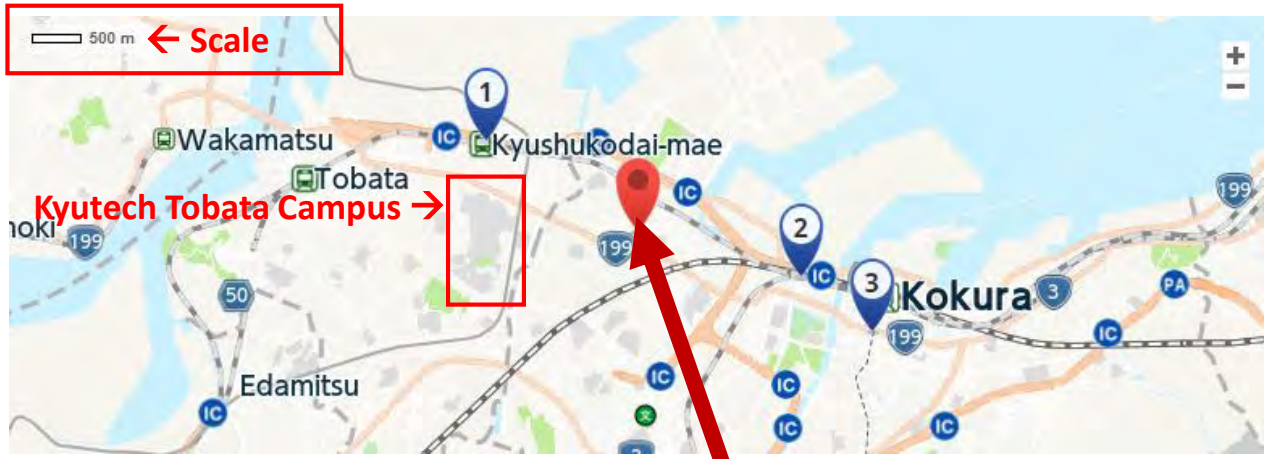
← Staff and students of SEIC

Adolfo, Paraguay
Azami, Malaysia
Cosmas, Kenya
Joseph, Ghana
Fahd, Morocco
Eyoas, Ethiopia
Victor, Zimbabwe
Ramson, Zimbabwe
Rodrigo, Mexico

All → the participants

SEE THE 10-MINUTE VIDEO OF THIS SOCCER WORK-OUT:
https://www.dropbox.com/s/zmsiaij9ckn6ne5/SEIC_soccer%20match%20of%2021-NOV-2020.MP4?dl=0

Location of the playing field – halfway between Kyushu-ko-dai-mai and Nishi Kokura stations; address is Fukuoka Kitakyushu-shi Kokurakita-ku Hiagari 3-7-7



1 **Kyushukodai-mae**
On foot about29minutes about2183 m

2 **Nishikokura**
On foot about29minutes about2205 m

3 **Heiwa-dori**
On foot about41minutes about3101 m

Futsal Stadium Foot-i Hiagari
フットサルスタジアム Foot-I (フットアイ)

17. BIRDS-4: Check out this NASA website

Thanks to Dr. Yamauchi for bringing this website to my attention. Editor.

SCIENCE OBJECTIVES FOR EVERYONE

The Joint Global Multi Nation Birds or BIRDS-4 Project is a constellation of three 1U CubeSats developed by Japan, Philippines and Paraguay, with Paraguay launching their first satellite. The mission of the BIRDS-4 satellites is to test commercial off-the-shelf components, as well as new technologies such as Perovskite solar cell and antenna using the satellite structure to prove their worthiness in space. BIRDS-4 deploys during the JEM Small Satellite Orbital Deployer-16 (J-SSOD-16) micro-satellite deployment mission, is handled by the Japanese Experiment Module Remote Manipulator System (JEMRMS), and launches to the International Space Station aboard the NG-15 Cygnus Cargo Vehicle. ***…. There is more at the link ….***

CHECK OUT THIS NASA DESCRIPTION OF BIRDS-4

https://www.nasa.gov/mission_pages/station/research/experiments/explorer/Investigation.html?#id=8447

Taking Nepal to Space

Hari Ram SHRESTHA

BIRDS-3

14 December 2020

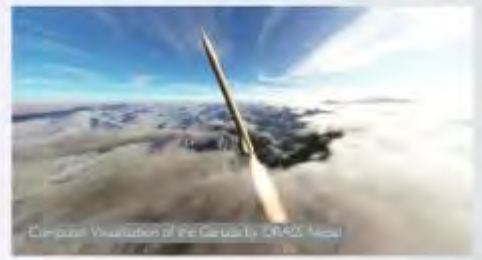
Current status of space technology in Nepal

On 21 November 2020, the Nepalese Student Association (NSA)@UTA hosted the "Taking Nepal to Space" webinar with the BIRDS-3 Satellite Project, Kyutech, ORION Space Nepal, and SEDS-Nepal.

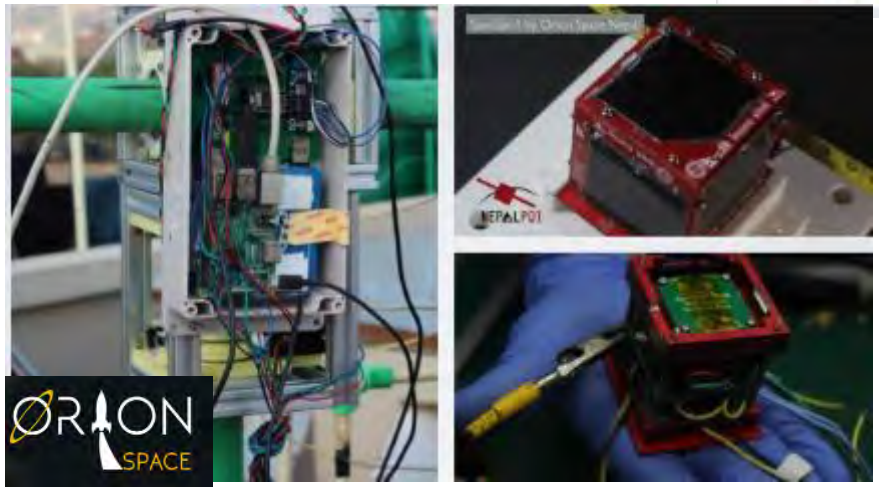
All three presentations were about their activities of their projects. Followings were presented by their organizer Jiten Thapa from ORION space, Ashwinee Kharel from SEEDS Nepal, and Hari Ram Shrestha from the BIRDS-3 project.

What was the purpose of this webinar?

NepaliSat-1 Web link,BIRDS-3



Garuda web link
Rocket,SEEDS Nepal



SanoSat-1,ORION Space web link

Current status of space technology in Nepal

Why National space center in Nepal?

Written By: Hari Ram Shrestha

Webinar Format: Presentations

How YOU can play a role in Space activity in Nepal.

- Nepal's first satellite NepaliSat-1(BIRDS-3 Satellite project)
- Space related projects happening in Nepal (Garuda Rocket).
- First Satellite built-in Nepal (SanoSat-I) and first Rocket Team

To increase awareness in Nepalese students in the US about:

- What is the current state of Space in Nepal
- What are the prospects? How does Space help Nepal?
- How to bring Space technology to Nepal
- How any Nepali student around the world can get involved
- To bring together Space enthusiasts (students/professionals) to discuss prospects with an interactive online session •

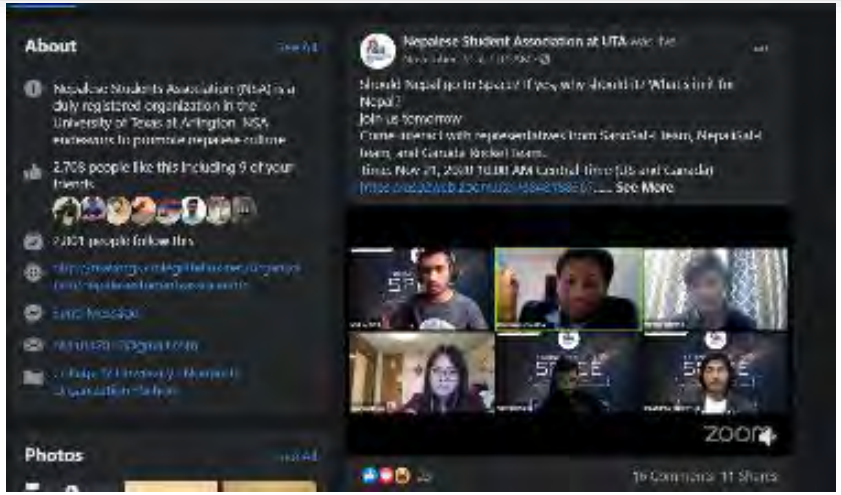
(And to give publicity to the teams doing amazing work in Nepal. So that they get more support. Public (understanding and) support is very important!)

Photo: Taking Nepal to space

Reference:Taking Nepal to Space program

Panelists discussion

Written By: Hari Ram Shrestha



As a panelist, we have had a very fruitful interaction with all the panelists. We got a lot of questions from the google form. We tried to discuss all the questions, gave our idea, explained the issues with experience, and answered all the questions. We will explore and believe in how to boost the future of Nepal's space science and technology.

Rakesh Chandra Prajapati, Simran Dhoju, Mohan Tamang, Hari Ram Shrestha were the panelist's members for this program.

- Pradipta Shrestha Ji and prince Agrawal Ji moderated the program. I would like to thank them.

Presentation slides

Written By: Hari Ram Shrestha

Taking Nepal to Space:
Introduction and current status of NepaliSat-1(BIRDS-3 Satellites) & future works in Nepal

Hari Ram Shrestha, Ph.D. Scholar
BIRDS-3
(under Prof. Mengu CHO)

Laboratory of Lean Satellite Enterprises and In-Orbit Experiments (La SEINE), Kyushu Institute of Technology, Kitakyushu, Japan

Agenda

- BIRDS-3 Project Introduction
- Nepal and Japan's Collaboration on NepaliSat-1
- NepaliSat-1 Purpose Design and Operation
- Research Centre in NAST
- NAST Ground Stations and Future Plans
- Q&A

Japan (日本)
Nepal (ネパール)
Sri Lanka (スリランカ)

BIRDS Introduction

- Acronym for Joint Global Multi-Nation **BIRDS** Satellite Project
- Multinational small satellite program led by Kyushu Institute of Technology (Japan)
- Gives opportunity to non-space fairing nations to **design, integrate, build, test, launch** and **operate** their nation's first satellite

BIRDS Countries

*First Satellites

BIRDS Program	Country
BIRDS-1	Japan, Ghana*, Mongolia*, Bangladesh*, Nigeria
BIRDS-2	Japan, Bhutan*, Malaysia, The Philippines
BIRDS-3	Japan, Nepal*, Sri Lanka*
BIRDS-4 (ready to launch)	Japan, The Philippines, Paraguay*
BIRDS-5(Preliminary design phase)	Japan, Zimbabwe, Uganda

BIRDS-3 Satellites

Kyushu Institute of Technology
Japan

Arthur C Clarke Institute for Modern Technologies
Sri Lanka

Nepal Academy of Science and Technology
Nepal

Continued from the previous page . . .

Written By: Hari Ram Shrestha

Space Engineering International Course (SEIC)

La SEINE

- Started in April 2013 at Graduate School of Engineering, Kyutech to support PNST.
- Research toward a Master or Doctoral degree.
- On-the-job training such as space environment testing workshop.
- Project Based Learning (PBL) through a Nanosatellite project.

Engineers, Please try to apply and get the PNST/SEIC Program in Kyushu Institute of Technology, Japan

Link:
http://www.unoosa.org/oosa/en/ourwork/psa/bsti/fellowships.html
https://kyutech-cent.net/seic/pnst.html

Prof. Mengu CHO. Principal Investigator, BIRDS project. Director ,LaSEINE, Kyushu Institute of Technology

https://unoosa.org/oosa/en/ourwork/psa/bsti/fellowships.html?fbclid=IwAR05Z3CA1AbOccMJCxhWLNG3OAFwhAleser1S3EvqSntHTBKEY0_hEiX0OI

END OF REPORT FROM NEPAL

19. SEIC Guest Lecture: Presentation by Dr. Guevarra, Undersecretary of DOST

SEIC Guest Lecture
by
Dr. Rowena Cristina L. Guevara

Undersecretary for Research and Development of the
Department of Science and Technology (DOST), Philippines

Title:
Space Science and Technology for Disaster Risk Reduction and Climate Change Adaptation in the Philippines

Presented to all the students of SEIC on 8 December 2020 via ZOOM

ABSTRACT

The Philippines' investment in Space Science and Technology (S&T) started in 2012 and culminated in the recent establishment of the ***Philippine Space Agency***. The driving force behind the huge investment in research and development and human resource development for Space S&T stems from the Philippines as one of the most disaster-prone countries. We have floods, earthquakes, tsunamis, storm surges, landslides, and the needed recovery in the aftermath. Space S&T and international collaboration have catalyzed the projects and programs, and produced the data and the tools for disaster risk reduction and climate change adaptation, and these will be covered in this lecture.

On the next 7 pages:
Overview of this lecture by Mark (BIRDS-4, Philippines).

How is R&D on Space and DRR in PH?

Key Take Away from Undersecretary Guevarra's Talk

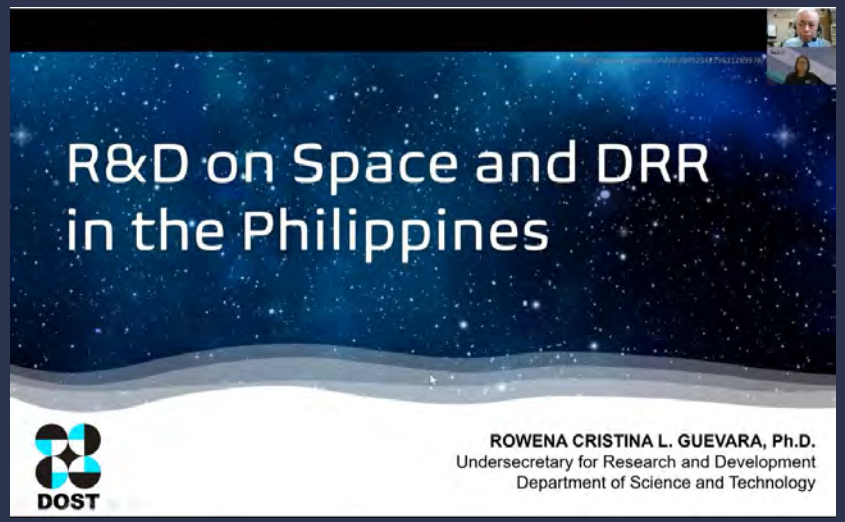
How is R&D on Space and DRR in PH?

Key Take Away from Undersecretary Guevarra's Talk

Dr. Rowena Christine L. Guevarra
Undersecretary
Department of Science and Technology (DOST)

On December 8, 2020, the Undersecretary for Research and Development of the Department of Science and Technology of the Philippines, delivered a short talk about the research and development (R&D) and disaster risk reduction (DRR) in the Philippines. This was attended by SEIC students.

This article highlights my personal take away from her presentation. This may contain screenshots of the slides presented by Dr. Guevarra.



How is R&D on Space and DRR in PH?

Key Take Away from Undersecretary Guevarra's Talk

Collective efforts go a long way.

As mentioned in her introduction, Dr. Guevarra recognizes the contribution of various Philippines agencies to produce her talk. This only means that it is in consolidated efforts that their goals are achieved. Below are the agencies mentioned but it is also possible that other institutions are involved such as universities, local government unit and the private sector. In addition, international cooperation broadens their horizon.

Logo Sources: Websites of the Agencies

DOST-PCIEERD

DOST-PHILVOLCS

PhilSA

DOST-PAGASA

DOST-ASTI

How is R&D on Space and DRR in PH?

Key Take Away from Undersecretary Guevarra's Talk

Building capacity and Involving people is vital.

For Dr. Guevarra, leveraging on human capital by providing training on data science & analytics, proliferation of know–how on small satellites and sending scholars abroad to study. It is believed the knowledge gained and shared can be used to advance the Philippines capability in space and space technology, thus resulting to applications that will benefit the Filipinos.

Sources: SPARTA FB Page, DOST Website

How is R&D on Space and DRR in PH?

Key Take Away from Undersecretary Guevarra's Talk

Government support and investment on R&D may be costly but also rewarding

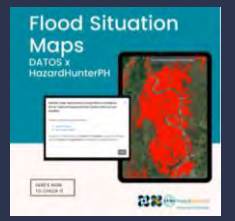
Even before the establishment of the Philippine Space Agency, DOST has been supporting space-related research and development projects since 2010. Support does not only correlate with funding but also political will and accurate policies pave way to this. To date, the Philippines is now reaping the benefits of space data.

How is R&D on Space and DRR in PH?

Key Take Away from Undersecretary Guevarra's Talk

Having data is good but saving and utilizing them is better

It is good to know that the Philippines invested on space-related, weather sensors and other pertinent data. According to Dr. Guevarra such data are stored in servers in both in-house and the cloud to keep all the data and have a backup. These data are then used for several applications most specially for disaster risk reduction and management for assessment and decision making.



Sources: DOST-PAGASA Website

How is R&D on Space and DRR in PH?

Key Take Away from Undersecretary Guevarra's Talk

Witnessing how far the Philippines have come in terms of space R&D and DRR, I can't help but look at what future is in store for my country in this niche. It is true that the developments in relation to space done in my country may be minute in comparison to other countries, but I truly believe that we are in the right direction. In the establishment of the Philippine Space Agency, I hope that efforts such as cited in the presentation are continued and supported for the benefit of my fellow Filipinos.

On behalf of the SEIC students, I would like to extend our appreciation to Dr. Guevarra and the agencies behind these works.

More power!

Article Written by:
Mark Angelo Purio
(15 Dec 2020)

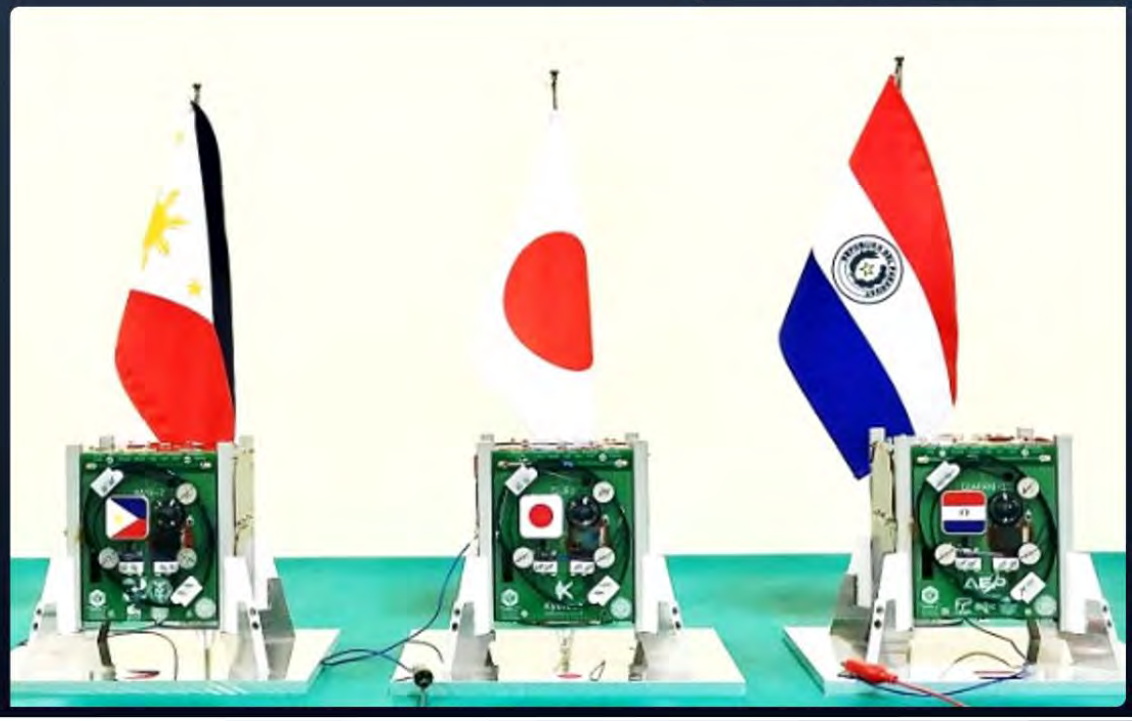
BIRDS-4 Monthly Newsletter

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Table of Contents for December Issue / 2020

By Mark Angelo Purio, 13 Dec. 2020

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



Preliminary Design Review Presentation (PDR) of the ICU Team

[UPDATE] In the June 2020 issue, it was announced that some members of the BIRDS-4 project partake in yet another challenging project: to develop an Earth Observation payload for a 3U CubeSat. In response to this, the members of the Image Classification Unit (ICU) of BIRDS-4 used the same mission payload in order to aid in downlinking usable images taken by the satellite.

Specifically, the Image Classification Unit (ICU) shall classify the images taken by an on-board camera and detect the clouds in it. In addition, it shall help in validating the efficiency of the algorithm used for the benefit of the CubeSat imagery and image downlink efficiency. [excerpt from PDR Document]

BIRDS-4 Image Classification Unit (ICU) team (L-R)

- ***Yasir Abbas*** *(Sudan): Team Leader + MCU Software*
- ***Timothy Leong*** *(France): Classification Algorithm*
- ***Hoda El-Megharbel*** *(Egypt): Schematic Design*
- ***Mark Angelo Purio*** *(Philippines): Mission Def. & PCB Design*

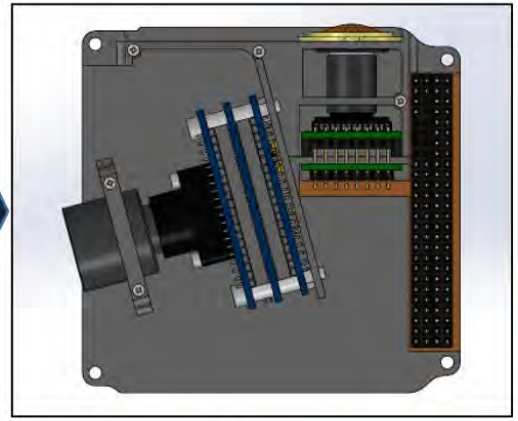
BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by:
Mark Angelo Purio

Preliminary Design Review Presentation (PDR) of the ICU Team

Despite of the pandemic, the team worked together in developing both the hardware and software requirements of the mission remotely. Every week, updates are presented with the rest of the CubeSat team via Zoom meeting. The team is also composed of other student groups from Indonesia (Telkom University) and Spain (Universitat Polytecnica De Catalunya). To keep the project on track, experts from The National Space Science and Technology Center (NSSTC), UAEU and IEEE Geoscience and Remote Sensing Society (GRSS) are overseeing the progress of the teams.

3D render of the payload being developed. This board is composed of the camera (top right) payload (Locana Team, Telkom University) and image classification unit (ICU Team, KyuTech). The star tracker (left), is also mounted on the board. Image provided by the Locana Team.



Just this September 2020, Timothy and Hoda finished their Master's degree from KyuTech and have returned to their respective countries, while Mark and Yasir are still in Japan finishing their Ph.D. degree. Although far from each other, the team members are doing their best to make progress. Tasks were delegated accordingly: e.g. while Timothy is developing the algorithm software, Mark is designing the PCB and Yasir is testing the boards for integration. To date, the team is still verifying their designs so the payload is ready for Engineering Model (EM).

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by:
Mark Angelo Purio

Preliminary Design Review Presentation (PDR) of the ICU Team

Last December 12-13, the Preliminary Design Review (PDR) was held online were invited reviewers are present to critique the works of the students, understand the overall satellite design and give feedback according to the contents of their work. Invited reviewers are George Komar – retired NASA Executive and Dr. Sachidananda R. Babu – Earth Science Technology Office, NASA, who gave constructive comments. During the presentation, Mr Komar highlighted the importance of the satellite project and how its beneficial for the learning of the students. He was fascinated of the progress shown by the teams despite of the difficulties brought about by the pandemic, specifically meeting each other to work. Dr Babu, on the other hand, noticed the utilization of the ICU team of Landsat data in developing the classificationalgorithm.

Cover Slide of the ICU Team PDR Presentation.

Logos of participating schools (KyuTech, UPC, & Telkom University)
Organizer & Key Agencies: NSSTC, UAEU & IEEE GRSS

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

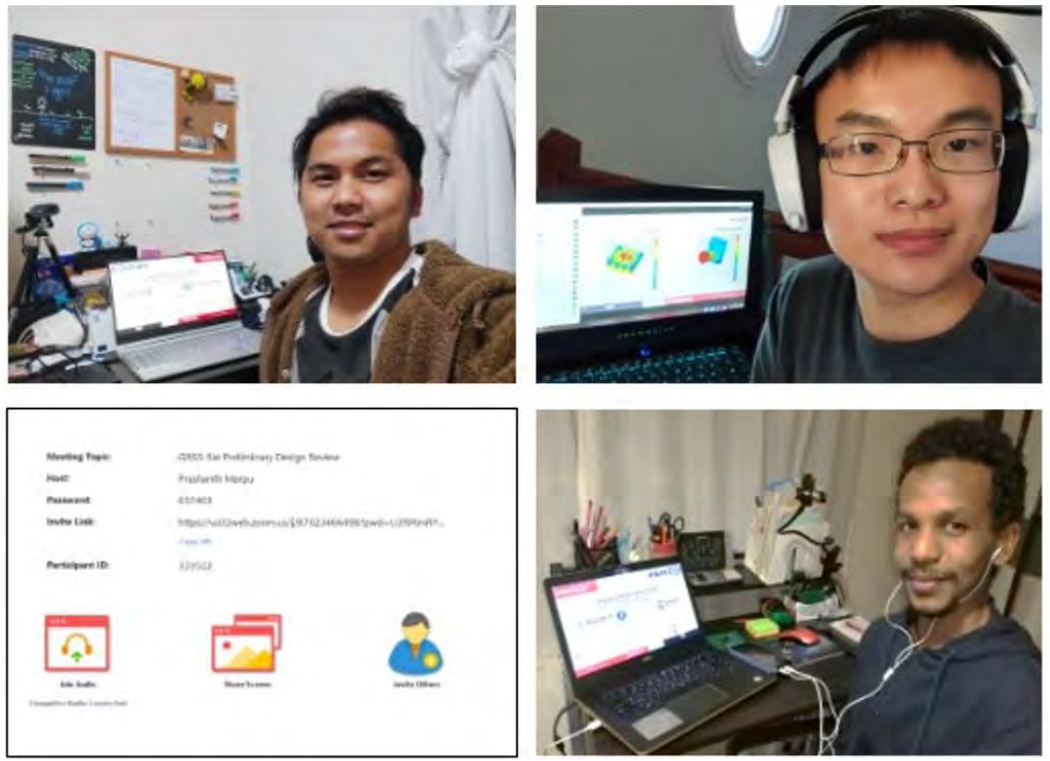
Article by:

Mark Angelo Purio

Preliminary Design Review Presentation (PDR) of the ICU Team

[Author's Notes] The pandemic might have brought changes in how we deal with our daily lives now : be it at work, at home or even in school. With the current technology, what once was hard to do can now be achieved: connecting people together despite of the distance. The GRSS CubeSat Project is one example that there can still be progress even if people are working and are located in different places. We are hoping to attain good outcomes from this endeavour.

Details regarding the CubeSat Project and the ICU Mission Payload will be updated in this newsletter in the future.



Photos of ICU Team Members during PDR via Zoom.

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Article by:
Mark Angelo Purio

Although 2020 has been a not-so-good year for everyone, we are looking forward to a remarkable year ahead of us.

Cheers to a prosperous 2021

UiTMSAT COLUMN

Column No. 12

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

UNIVERSITI TEKNOLOGI MARA

UiTM Sentiasa Di Hatiku
"UiTM Always in My Heart"

Development of UiTM Space Weather Report Platform

Space Weather is associated to the state of the Sun. As Sun actively emits its heat, there is some turmoil condition happened on its surface due to the effect of magnetic field. This condition is referred as solar activity where the charged particles and gasses are radiated into the space. The propagation of the particles into the space is called as solar wind and if the turmoil is intense, solar storm will happen.

As the solar wind reaches our planet Earth, another activity occur as our planet is 'equipped' with atmosphere and strong magnetic field. These two (2) components prevent the solar wind from entering the Earth and damaging the environment. The prevention activity that our atmosphere and magnetic field do, occasionally

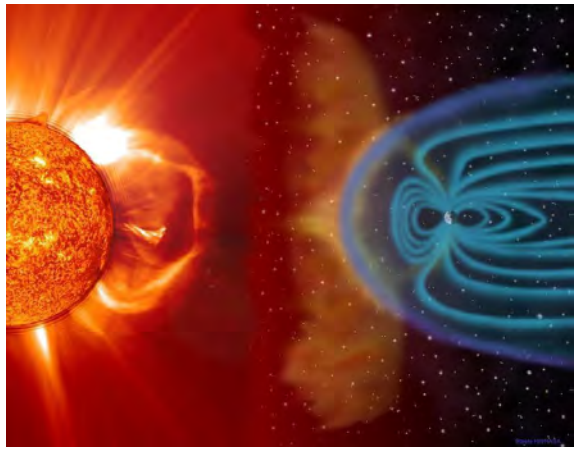


Fig. 1: Solar activity on the Sun (left) and magnetic field of the Earth (right) [Ref: spaceplace.nasa.gov]

produces the effect called Aurora. Some of the particles from the solar wind may penetrate the magnetic field of the Earth and collide with our atmosphere. During this event, some disruption and defect to the electricity grid, solar cell and telecommunication cable on the Earth could occur. For record, the artificial satellites in space are also exposed to the radiation of the solar wind.

Space weather activity happens suddenly and can only be forecasted by the scientists. Therefore, it is important to have the space weather monitoring in order to get notified and also to avoid the Earth's environment from being affected.

In Laboratory of Space Weather and Satellite System, Faculty of Electrical Engineering, Universiti Teknologi MARA (UiTM), Selangor, Malaysia, a platform that is called as **Space Weather Report UiTM** has successfully developed using the Google Sites.

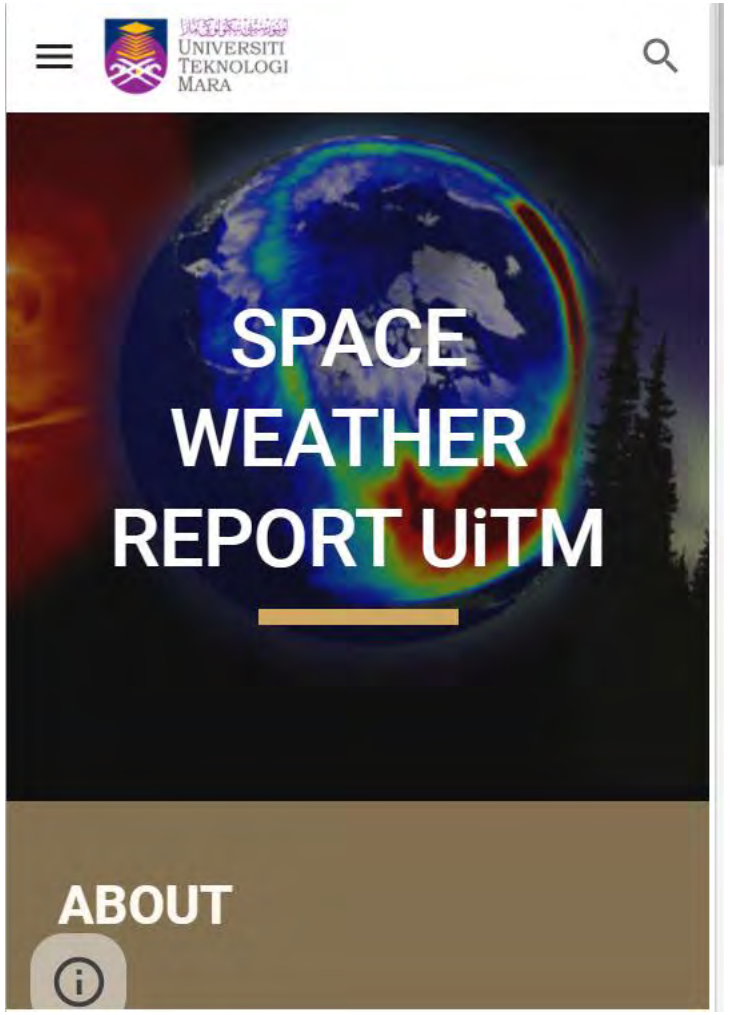
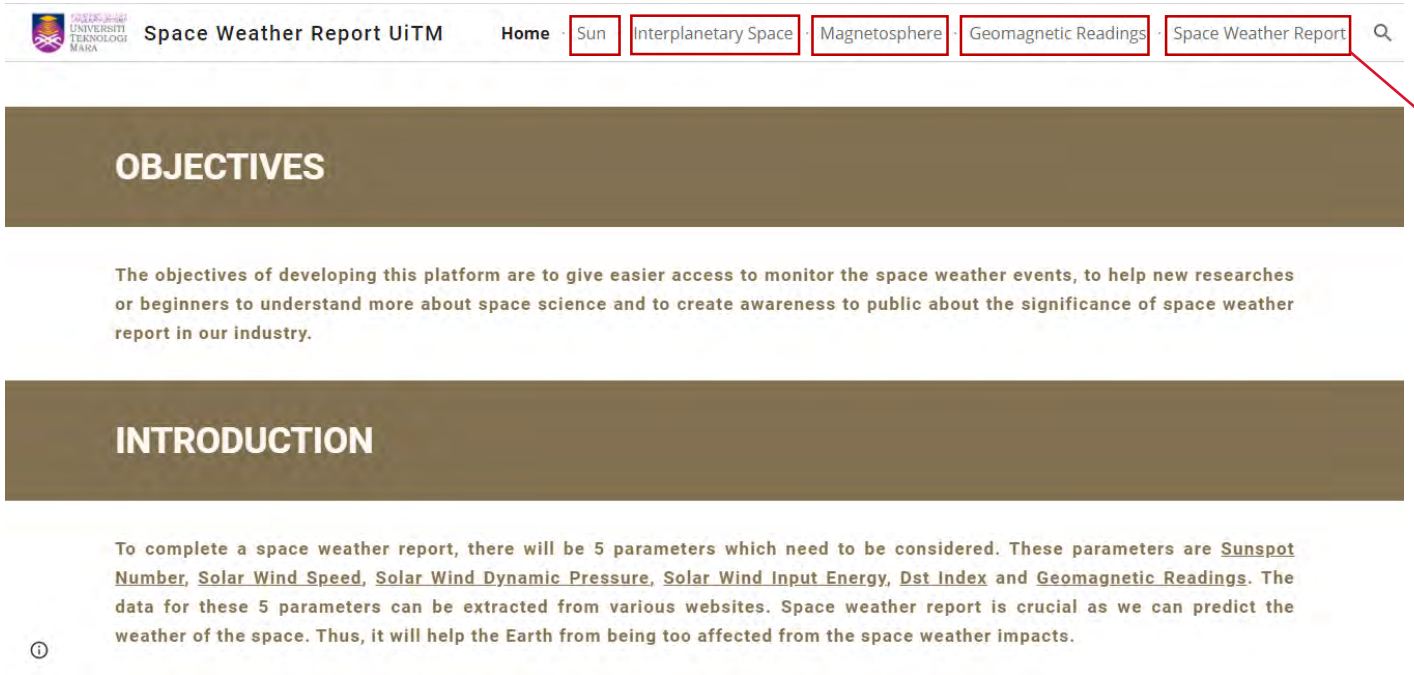


Fig. 2: The home page of Space Weather Report UiTM web page

https://sites.google.com/view/spaceweatherreportuitm/home



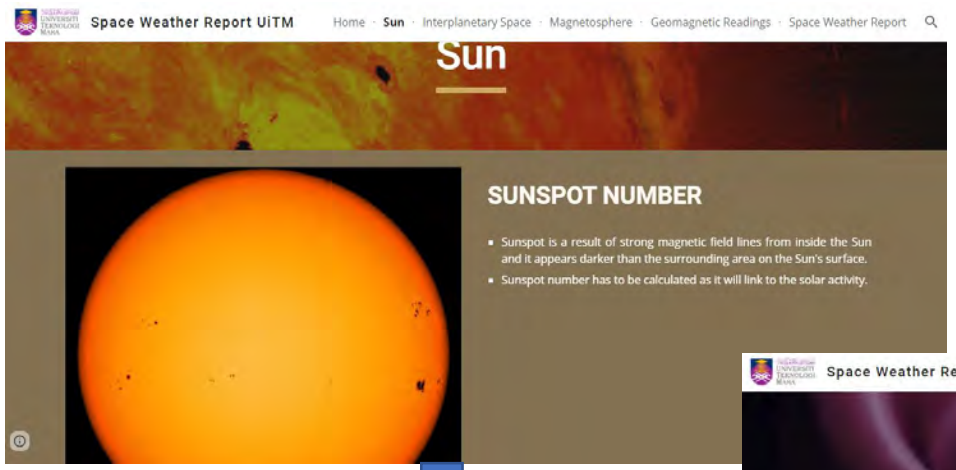
Contents of the space weather monitoring platform can be found here.

Fig. 3: Information about the platform is stated on the Home Page.

The developed space weather monitoring platform consists of the information of the main space weather parameters such as **Sun**, **Interplanetary Space**, **Magnetosphere**, and **Geomagnetic Readings**. The data from various websites pertaining the space weather parameters is collected to be included in the platform. This data is represented in a form of graph (plotted using MATLAB) in order to provide a convenience view for analysis. The **Space Weather Report** can be compiled once the results of the analysis are successfully done.

Space Weather Report UiTM offers a complete space weather report and information to those who are seeking knowledge about the space science, especially for the new researchers.

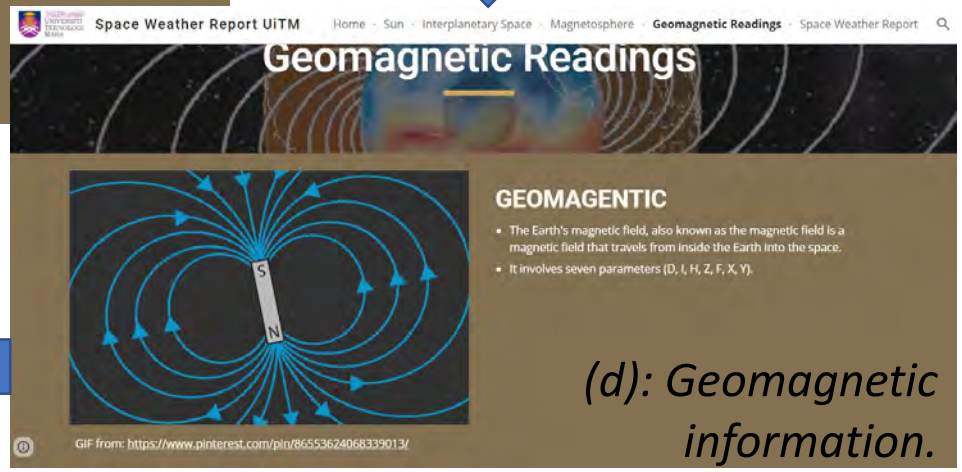
Fig. 4(a) – (e): Content of the developed platform:



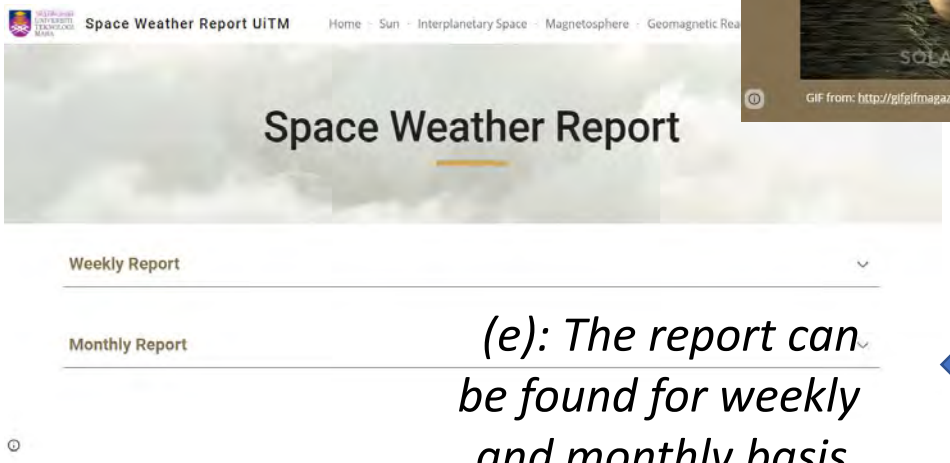
(a): The page for Sun data.

(b): Interplanetary Space data

(c): Magnetosphere data.



(d): Geomagnetic information.



(e): The report can be found for weekly and monthly basis.

There is also a guideline provided in the platform for the user to prepare the space weather report using the data from each of the space weather parameters aforementioned. The guideline is available in the Home Page of the website.

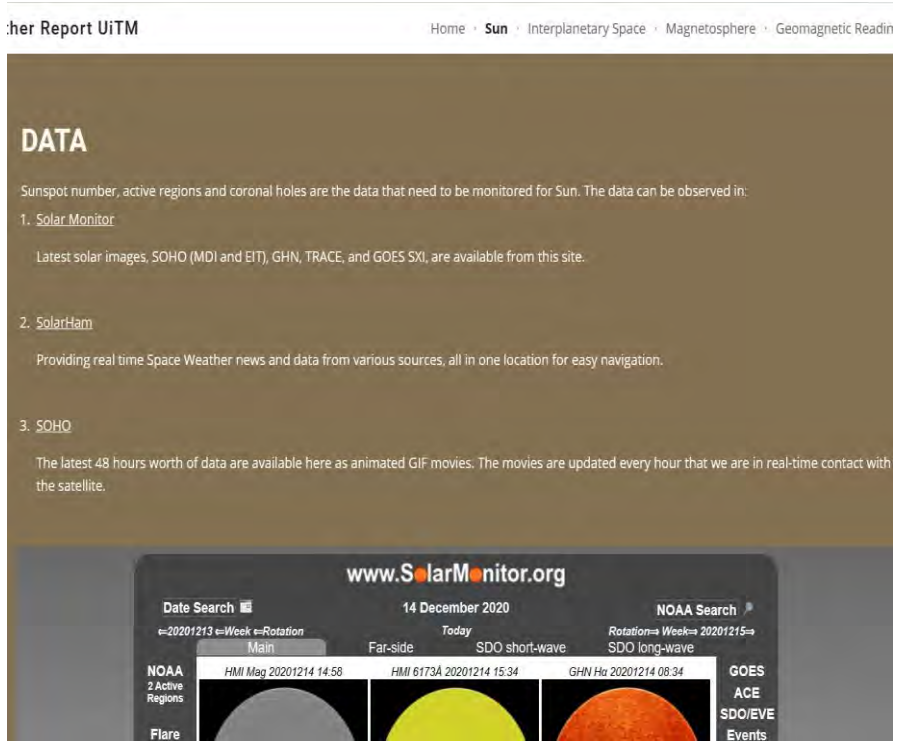


Fig. 5: Each of the space weather parameters contains lists of related data for the user to get more knowledge and information.

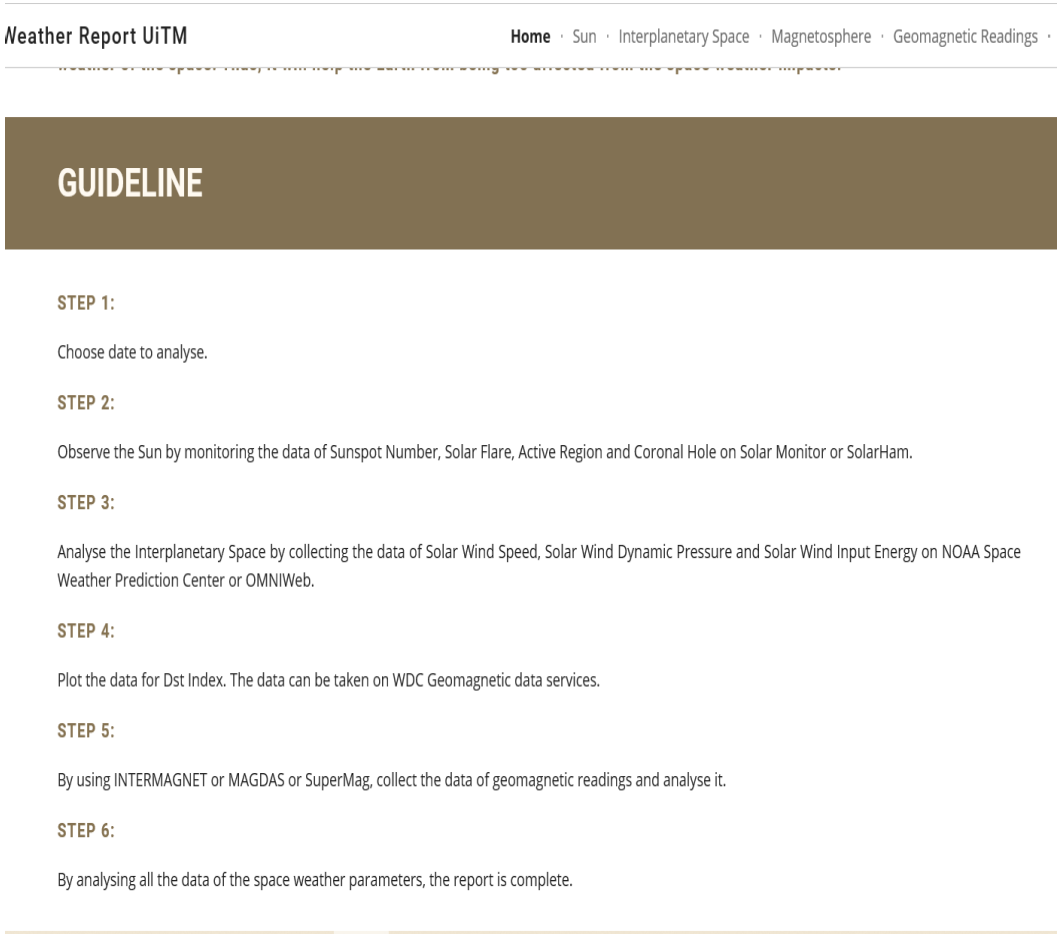


Fig. 6: The guideline to generate the space weather report.

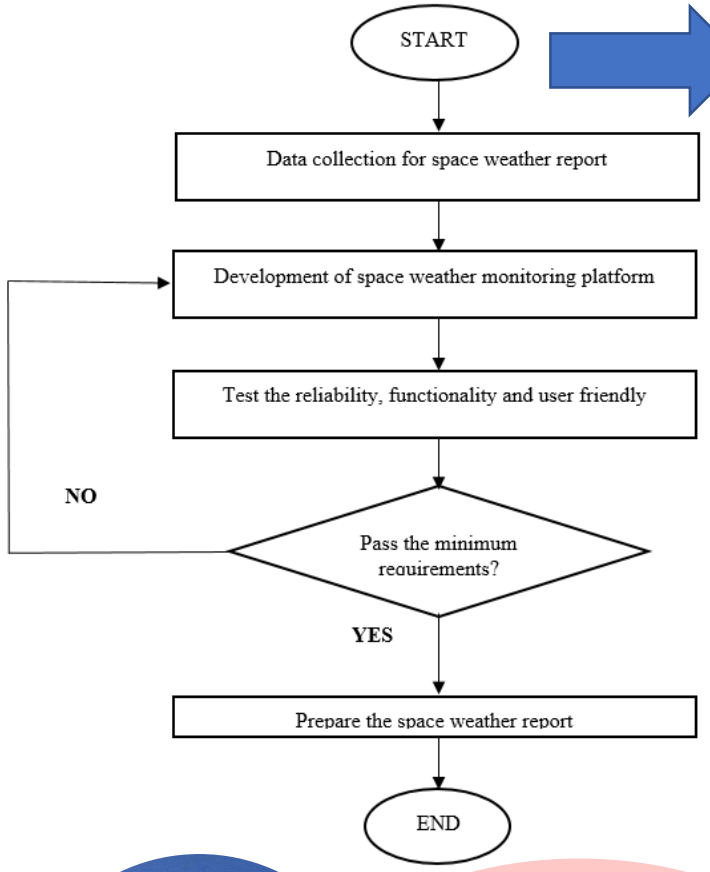
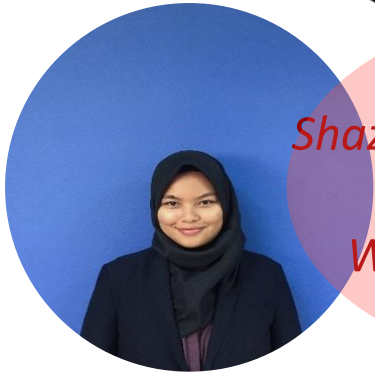


Fig. 7: The flow chart on the left shows the process of developing the space weather monitoring platform from the very beginning. As explained earlier, it was started by collecting the data from various websites for the space weather parameters. The data is used as the contents of the space weather monitoring platform. A performance test is conducted for the developed platform in order to ensure the reliability, functionality and user friendliness of the developed website. This developing process needs to be performed recurringly until the minimum requirements are achieved.

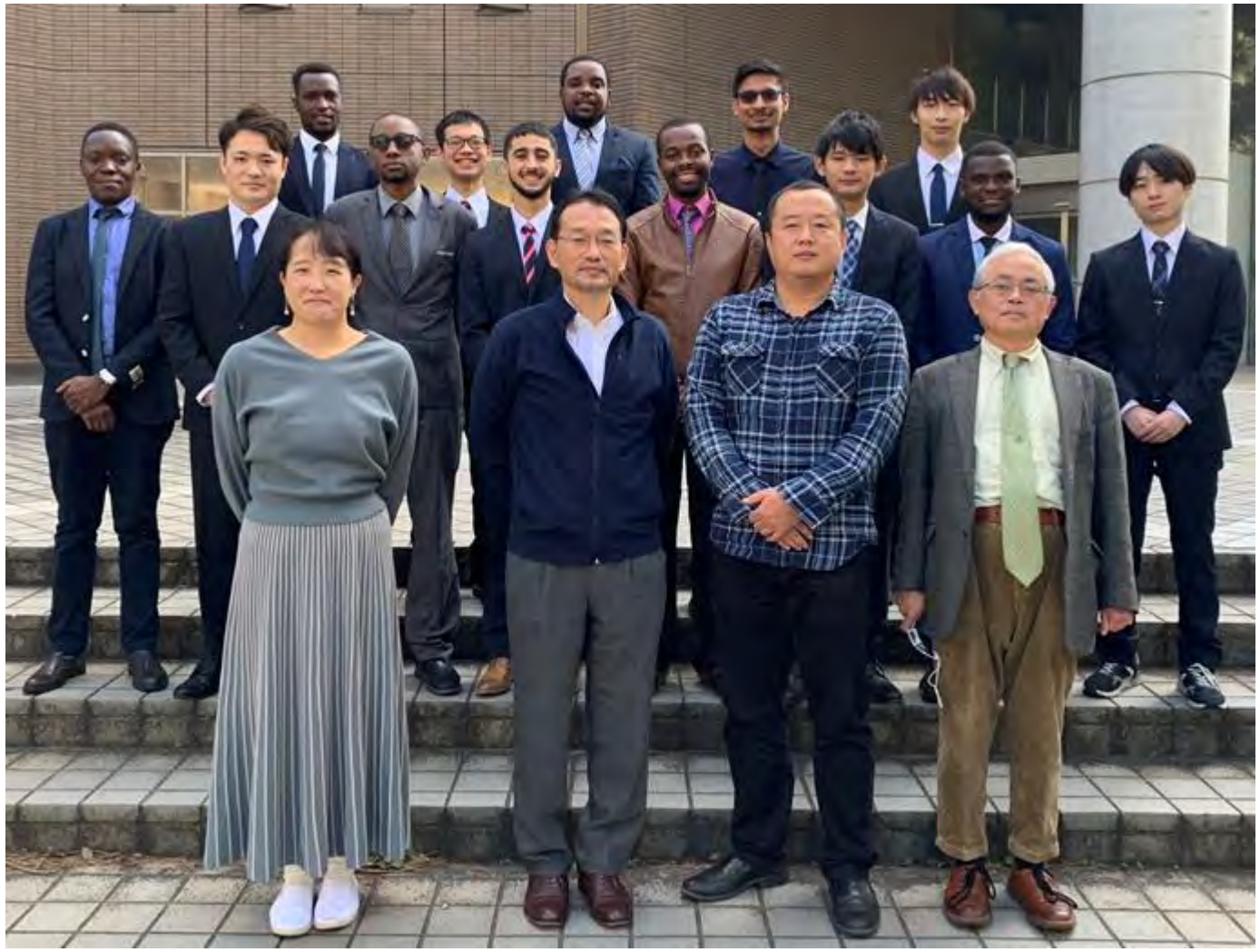


Credit to Ms. Nor Shazwaney Atiqah Ibrahim, developer of Space Weather Report UiTM Platform.

The purposes of Space Weather Report UiTM platform:

- to give easy access to user to monitor the space weather events.
- to help new researches or beginners to understand more about space science.
- to create awareness to public about the significance of space weather, especially in the industry.

End of Malaysia's Column



BIRDS-5 Team on 30-OCT-2020 (Dr. Masui is missing in this group photo)

BIRDS-5 reports of this month are on the following pages

Thermal Vacuum Test on Ni-MH Batteries

By : Derrick TEBUSWEKE

Date: 7 December 2020

What are Ni-MH Batteries?

Rechargeable Batteries: Secondary cells are built to be recharged and reused many times.

They convert electrical energy into chemical energy during charge.

Example: Nickel Metal Hydride (Ni-MH) and Lithium Ion batteries, widely used in Aerospace industry.

BIRDS5 CubeSats will use Panasonic Eneloop Batteries, (Ni-MH)

Hence the need for screening tests (Environmental tests).

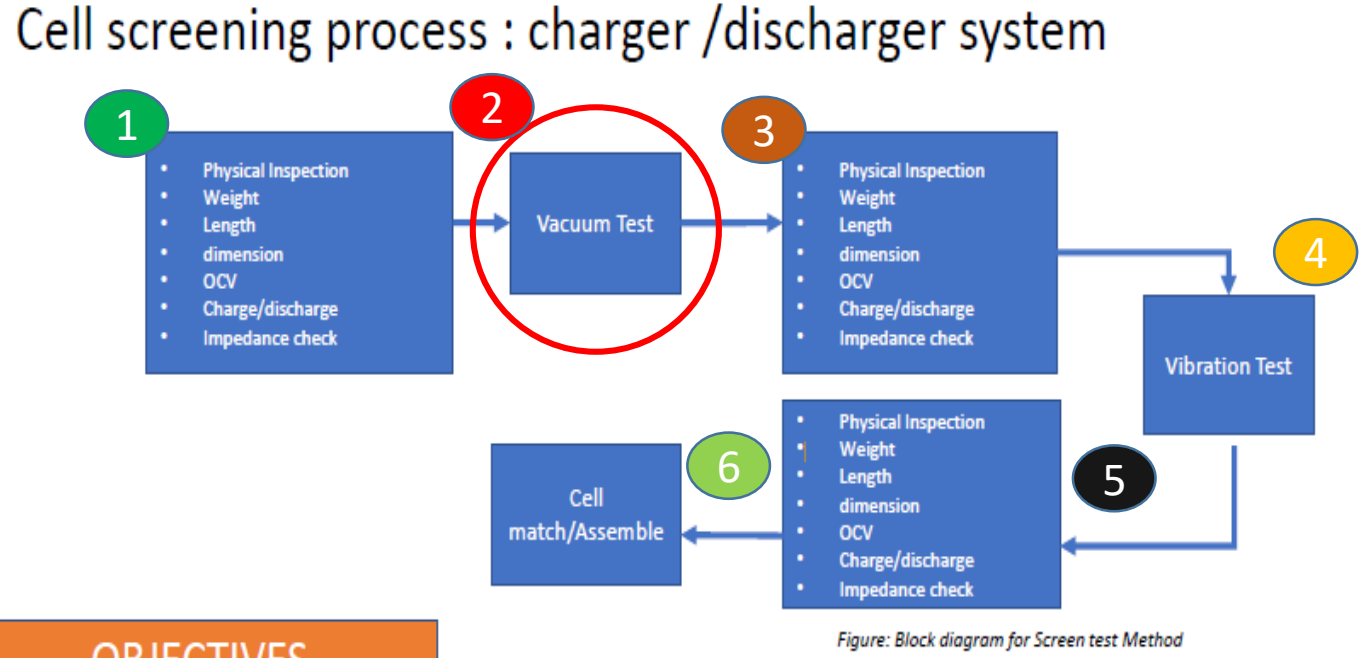


Figure: Block diagram for Screen test Method

OBJECTIVES

- Measure the Physical properties and electrochemical characteristics
- Find defects
- Assemble battery with the best

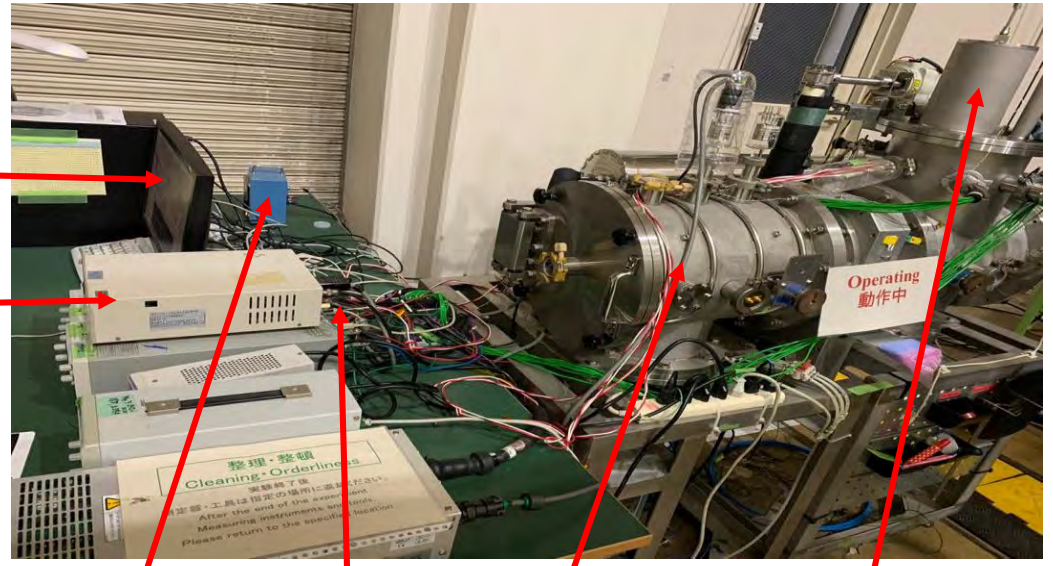
What is a Thermal Vacuum Chamber (TVC)?

Chamber in which space thermal and vacuum environment is controlled.

Used for testing spacecraft or parts under simulated space environment.

Low Earth Orbit Environment:
Temperature: -269.15 ℃ to 130 ℃
Pressure: 10–700 **nPa** (Compared to Earth's pressure of 101,325 **Pa)**

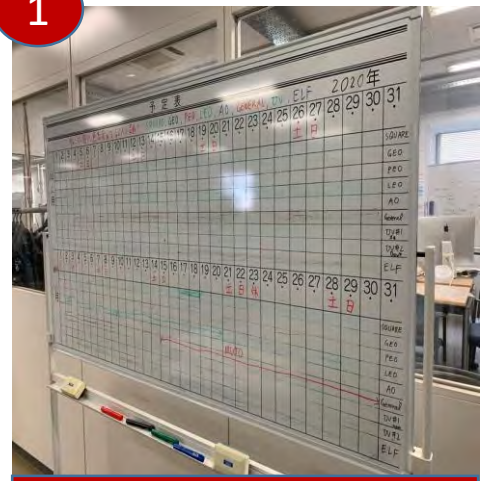
A satellite in Low Earth Orbit
Source: http://soreq.gov.il/mmg/eng/Pages/Low-Earth-Orbit-(LEO).aspx



A Thermal Vacuum Chamber at CeNT of Kyutech

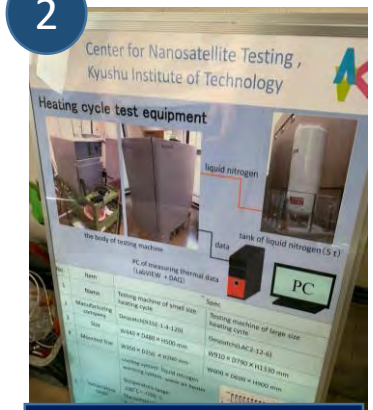
Test Procedure:

1



First book to use the chamber

2



If approved, then read the manual and wear safety attire.

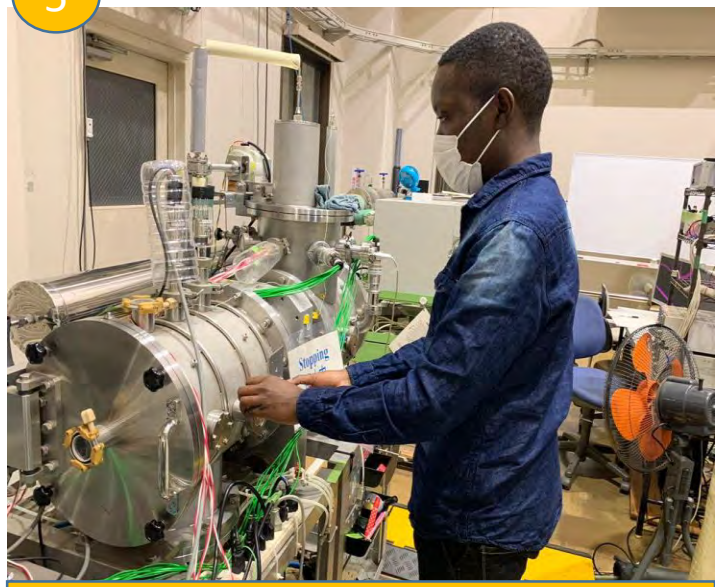
3

Clean the chamber with alcohol, then assemble all batteries with Kapton tape on a conductive metallic tray.

4

Insert the batteries in the chamber

5

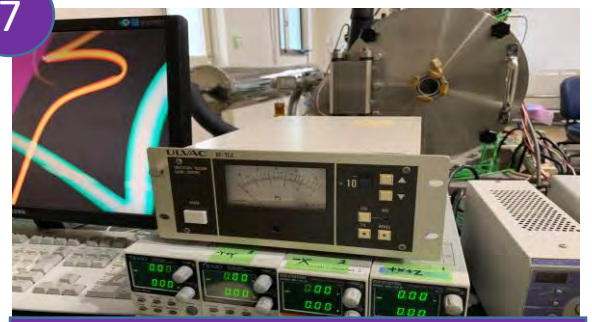


Ensure unnecessary valves are Closed

6

Switch on the Cryogenic pump and Vacuum pump. Set Vacuum at 1x10-3 Pa

7



Control Heating, Cooling via the gauges.

8

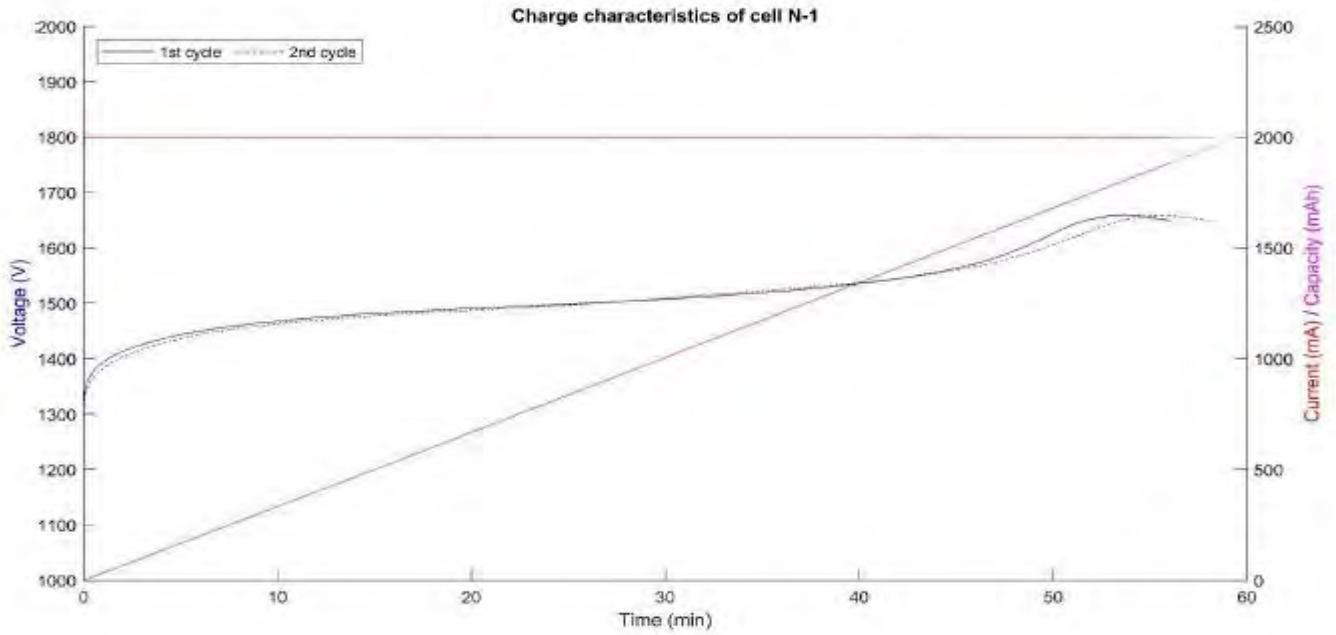
Put OPERATION Tag and record all readings.

9

After 6 hours, STOP Test.

Analysis of results

Measure the battery cells' mass, Open Circuit Voltage and capacity before and after the vacuum test.



If variations are found between the first cycle and the second cycle, that battery cell is deemed not ideal for cell matching. Hence dropped.

End of this article

ZIMBABWE NATIONAL GEOSPATIAL AND SPACE AGENCY GROUND STATION EXPANSION

vision 2030 movement

towards achieving the Zimbabwe we want.

BIRDS-5 CubeSats

Kyushu Institute of Technology

By : Victor Mukungunugwa

15/12/2020

Zimbabwe National Space Agency (ZINGSA)

PREAMBLE

- ZINGSA is established under the Research Act (Chapter 10:22) The objectives of the Zimbabwe National Geospatial and Space Agency are to:
- Promote the peaceful use of space.
- Support the creation of an environment conducive to industrial development in space technology.
- Foster research in Geospatial Science and Earth Observation, space science, space engineering and technological competences and capabilities through human capital development outreach programmes and infrastructure development.
- Foster international cooperation in space related activities.

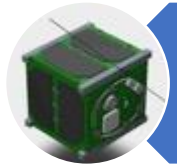
BIRDS 5's contribution to Zimbabwe vision 2030

BIRDS 5 Will contribute to 5/10 Zimbabwe's vision goals & targets that include :

1. Vision 2030 seeks to fundamentally transform Zimbabwe to an upper middle income economy, with a per capita Gross National Income of over US$5000 in real terms by 2030, from the current US$1 440.
2. Vision 2030 targets increasing the number of households accessing electricity from 52.2 percent in 2017 to over 72 percent by 2030.
3. By 2030, it is envisaged that Zimbabwean households will have universal access to improved sources of water, up from 81 percent in 2017.
4. Noticeable improvements will also be in the areas of awareness, knowledge adoption, food security, affordable and accessible education & health services, infrastructure development, and economic empowerment.

ZINGSA PROGRAMMES 2021-2025

Space Science Programme



Space Engineering Programme

Space Operations and Launch Services Programme

Geospatial Science and Earth Observation Programme

Administration Programme

ZINGSA NEW CONSTRUCTED BLOCK

Newly Constructed ZINGSA Office Block

Professor Maeda`s visit to ZINGSA in 2019

Facilities

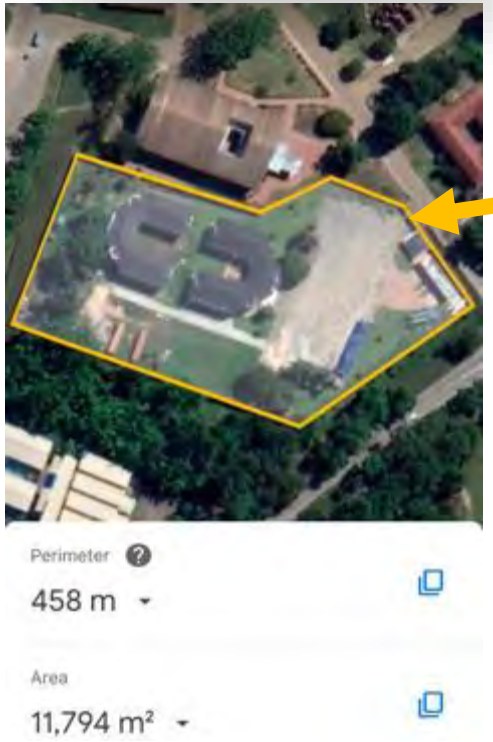
- Offices
- High performance computing
- ZINGSA boardroom
- ZINGSA geospatial science and earth
- observation laboratory

ZINGSA NEW CONSTRUCTED BLOCK

ZINGSA BOARDROOM

ZINGSA GEOSPATIAL SCIENCE AND EARTH OBSERVATION LABORATORY

New block sits on 12000m^2



ZINGSA new block from google earth

GROUND STATION EXPANSION

Communications ground station seating on 64000m^2

Communications antenna at the current ground station

On Mazowe site ZINGSA has communications ground station and the Zimbabwe Government will expand to house all space related activities to facilitate the achievement of the vision 2030.

Land allocated to ZINGSA for expansion

For all space related activities the Government of Zimbabwe has allocated additional 600 000m^2 to make a total of 664 000m^2 for current and future space projects.

ZINGSA have made plans for this land, from 2021 ZINGSA will start using 20 000m^2 for the following activities:

1. BIRDS 5 ground station and other earth observation facilities
2. Satellite test facilities
3. Satellite laboratories and assembly facilities
4. Research and development

Next to communications ground station,600 000m^2 allocated to ZINGSA

AROUND ZINGSA GROUND STATION AREA

Zimbabwe`s most famous drink is made from Mazowe citrus

Beautiful mountain view and citrus plantations along the way to ZINGSA

Mazowe area is rich in gold, some gold panning in the Mazowe river

Pamushana holiday resort

Brim from Mazowe dam

Freda Rebecca Gold Mine 27.6 tonnes of gold in 2019

Mazowe hotel

References

- https://encryptedtbn0.gstatic.com/images?q=tbn:ANd9GcTrA6Zl0R8t6Rn0tsSsxPmPIzs6P_bmTXCJbQ&usqp=CAU
- https://www.researchgate.net/figure/Heliophysics-Solar-and-Space-Physics-Great-Observatory_fig1_269523988
- https://allthecities.com/cities/mazoe
- https://www.zimbogini.com/mazoe-orange-crush.html
- https://singita.com/lodge/singita-pamushana-lodge/

END OF THIS SECTION

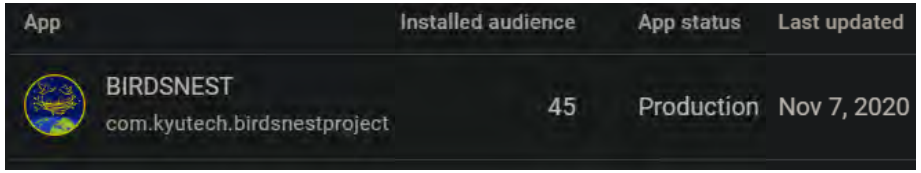
BIRDSNEST

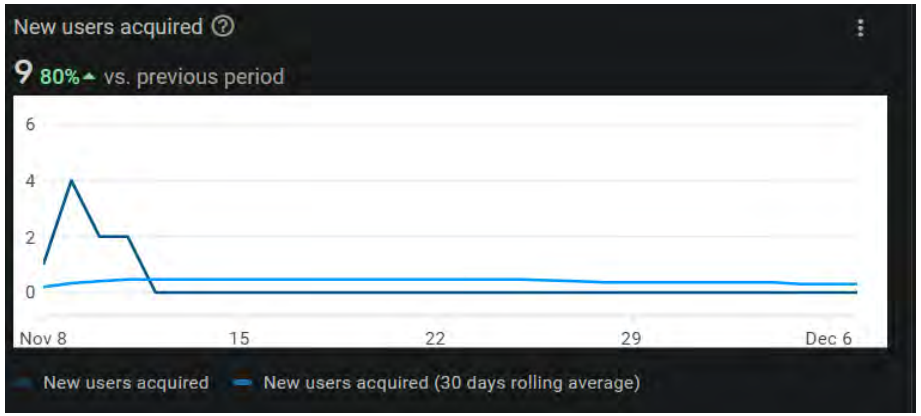
By: Keenan Chatar

09/DEC/2020

Android Dashboard Data

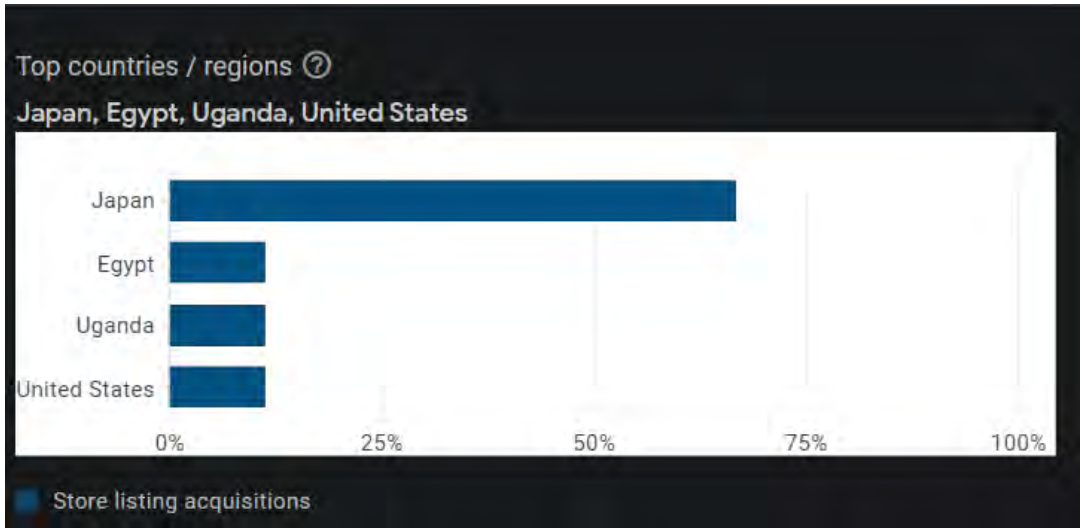
- The BIRDSNEST app is currently downloaded by 45 Android users
- Nine (9) new users this month
- Average Rating: 5☆



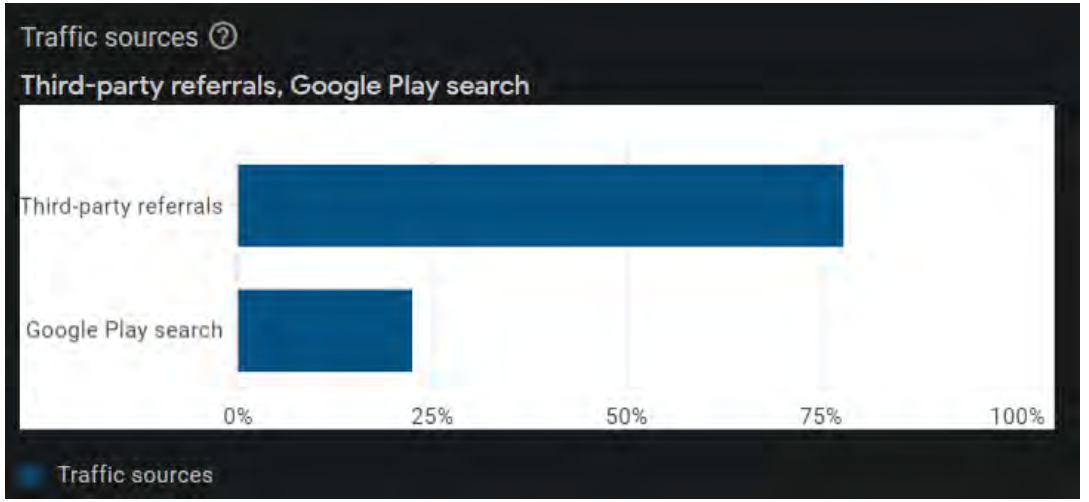


Android Dashboard Data

- Top countries are:
  - Japan
  - Egypt
  - Uganda
  - United States of America



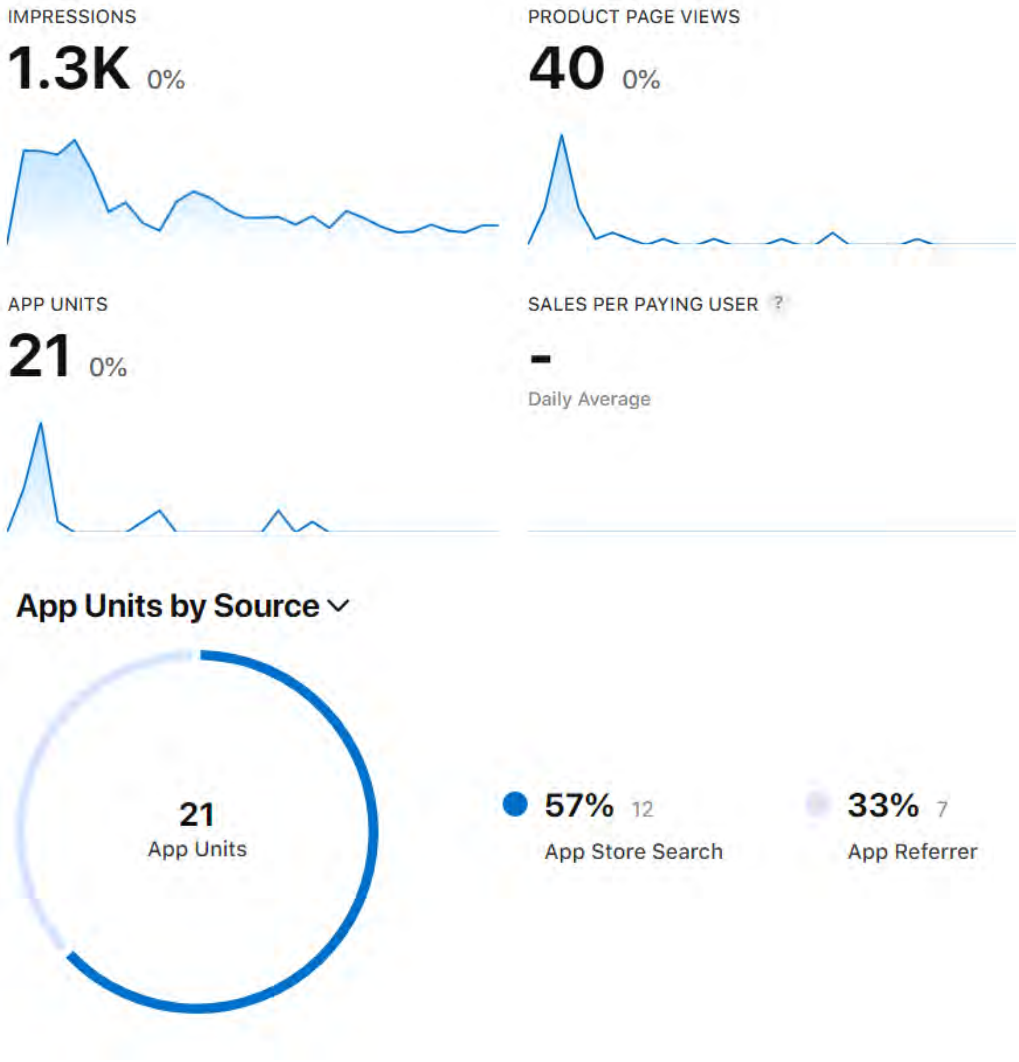
- Most users are referred to the app via 3rd party and then Play Store searches



IOS Dashboard Data

- 1.3k App showings
- 21 IOS downloads
- 40 Page views

- 12 App store searches
- 7 Referrals



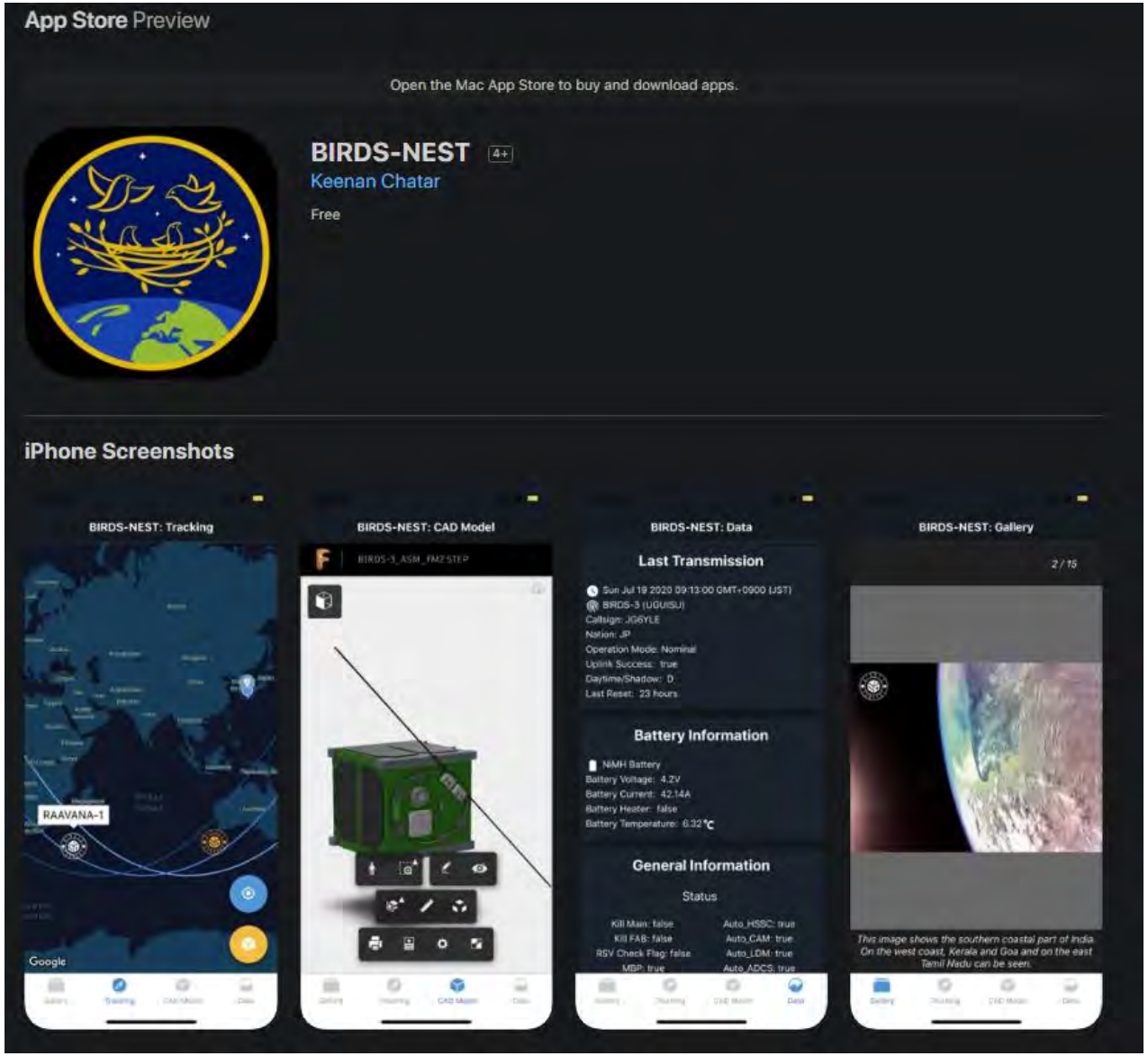
Available on IOS and Android!

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

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

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

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



Official names of the BIRDS-5 Satellites

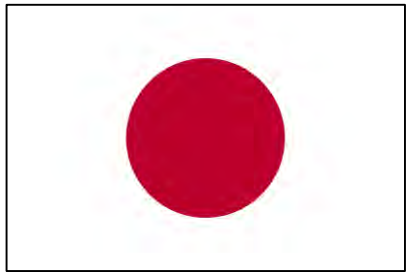
By : Fahd Moumni

Date : 9 December 2020

Announcement

- The following pages are presenting the official names of each country's satellite for the BIRDS-5 project.
- The countries satellite names are presented following the alphabetical order of the countries names.
- Names of the satellites were chosen upon discussions to satisfy both stakeholders and members of the project.

JAPAN



The official name for the Japanese satellite is :

TAKA

Meaning : Hawk/Falcon 鷹

UGANDA

The official name for the Ugandan satellite is :

PearlAfricaSat-1

ZIMBABWE

The official name for the Zimbabwean satellite is :

ZIMSAT-1

Space Weather

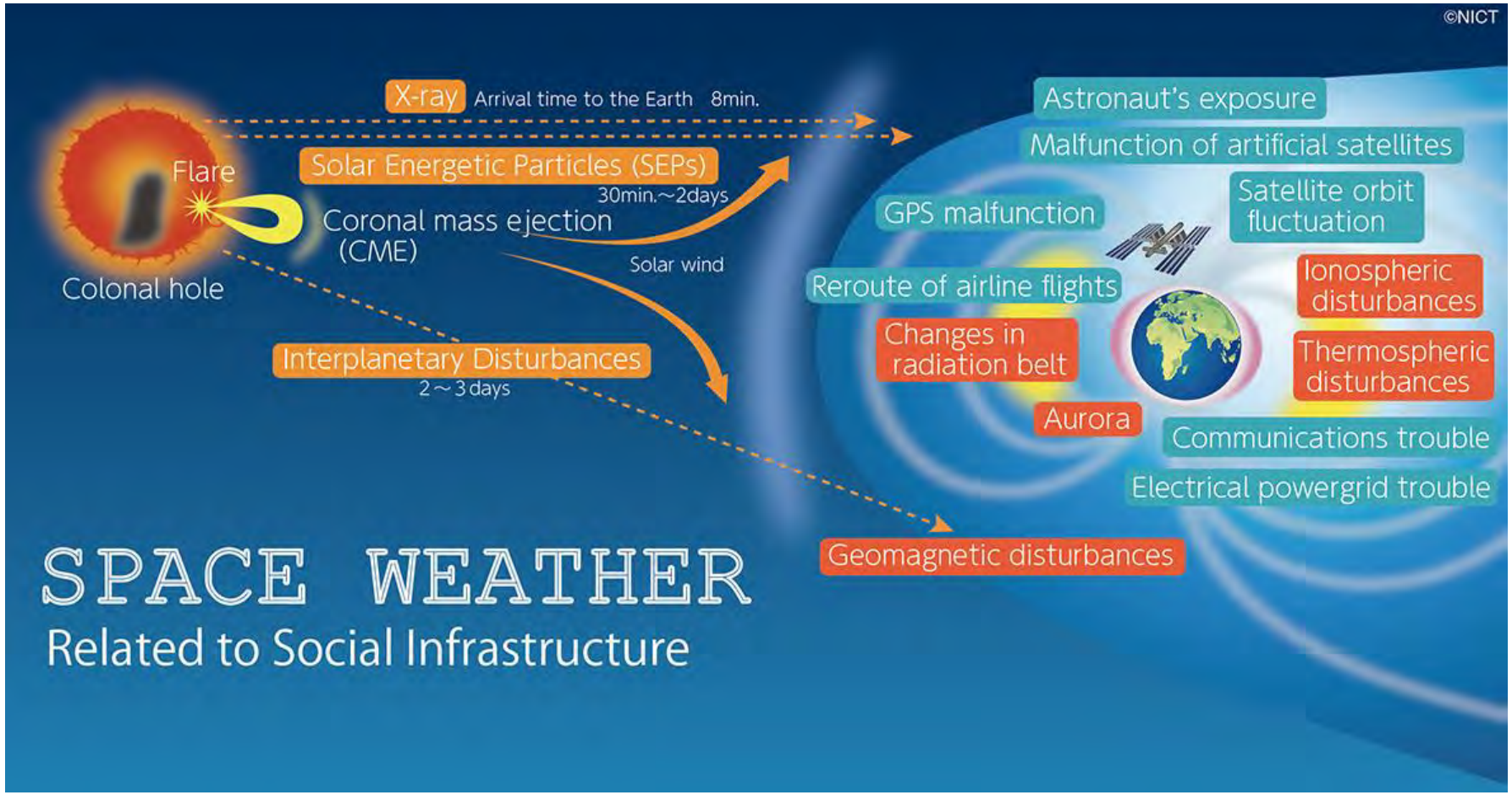
Mariko Teramoto, and PINO team

December 11, 2020

Space Weather

The sun is responsible for the disturbance in our space just as it derives weather on Earth. The space weather disturbances cause magnetic field and plasma variations.

This figure shows effects of the space weather disturbances on human activities.



https://swc.nict.go.jp/en/knowledge/relation.html

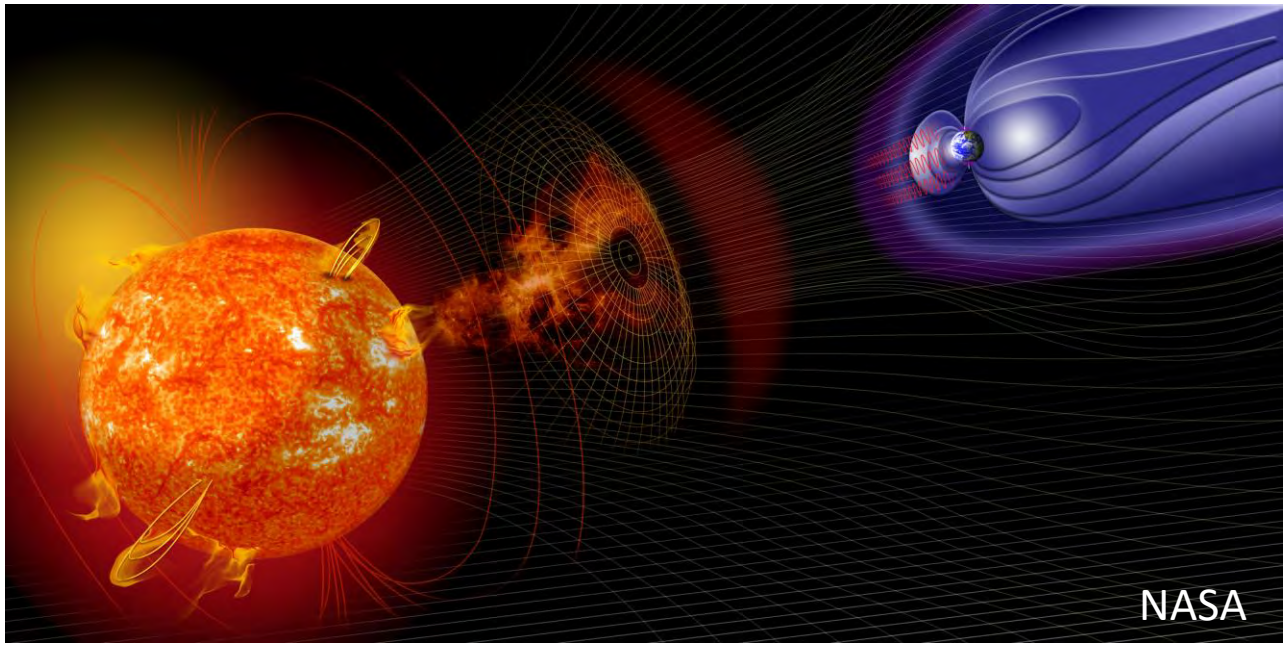
The geomagnetic storm

One of the space weather phenomena is **the geomagnetic storm**. A geomagnetic storm is a disturbance of the terrestrial magnetic field caused by a **reconnection** of the magnetic field lines of the solar wind and the Earth.

When the magnetic reconnection happens in space, we can see brightening auroras on the ground.

The magnetic reconnection plays important roles to transport plasma from space to the near-Earth.

What is magnetic reconnection?



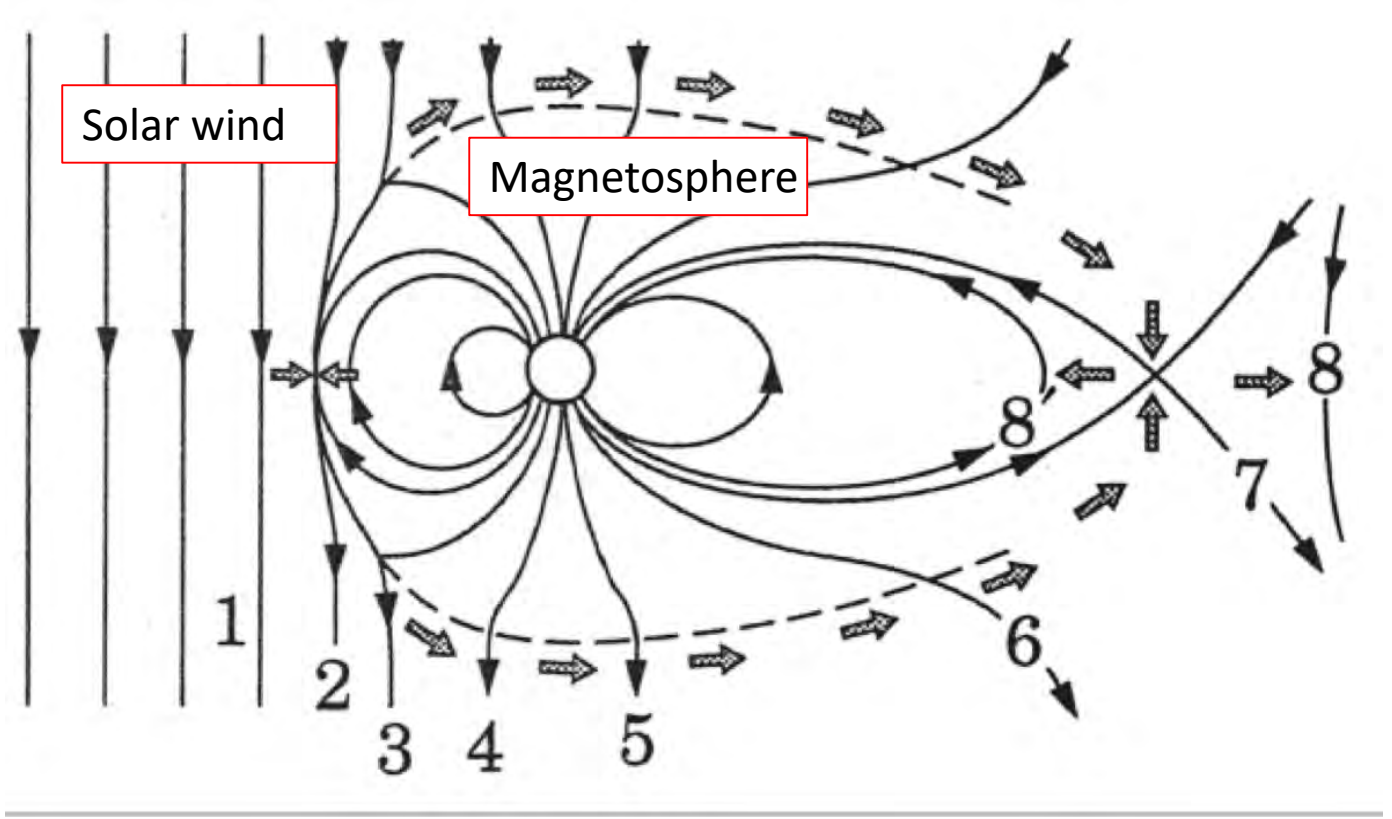
Magnetic reconnection

This figure shows the process of the magnetic reconnection.

When the magnetic fields in the solar wind are oriented southward (1), the reconnection of the magnetic field lines occurs in the dayside of the Earth (2).

By the reconnection, the terrestrial magnetic field lines connect to those of the solar wind and migrate to the nightside (3-6). The reconnected magnetic fields become open fields.

In the nightside of the Earth, the terrestrial magnetic fields reconnect (7) and close again (8,8').



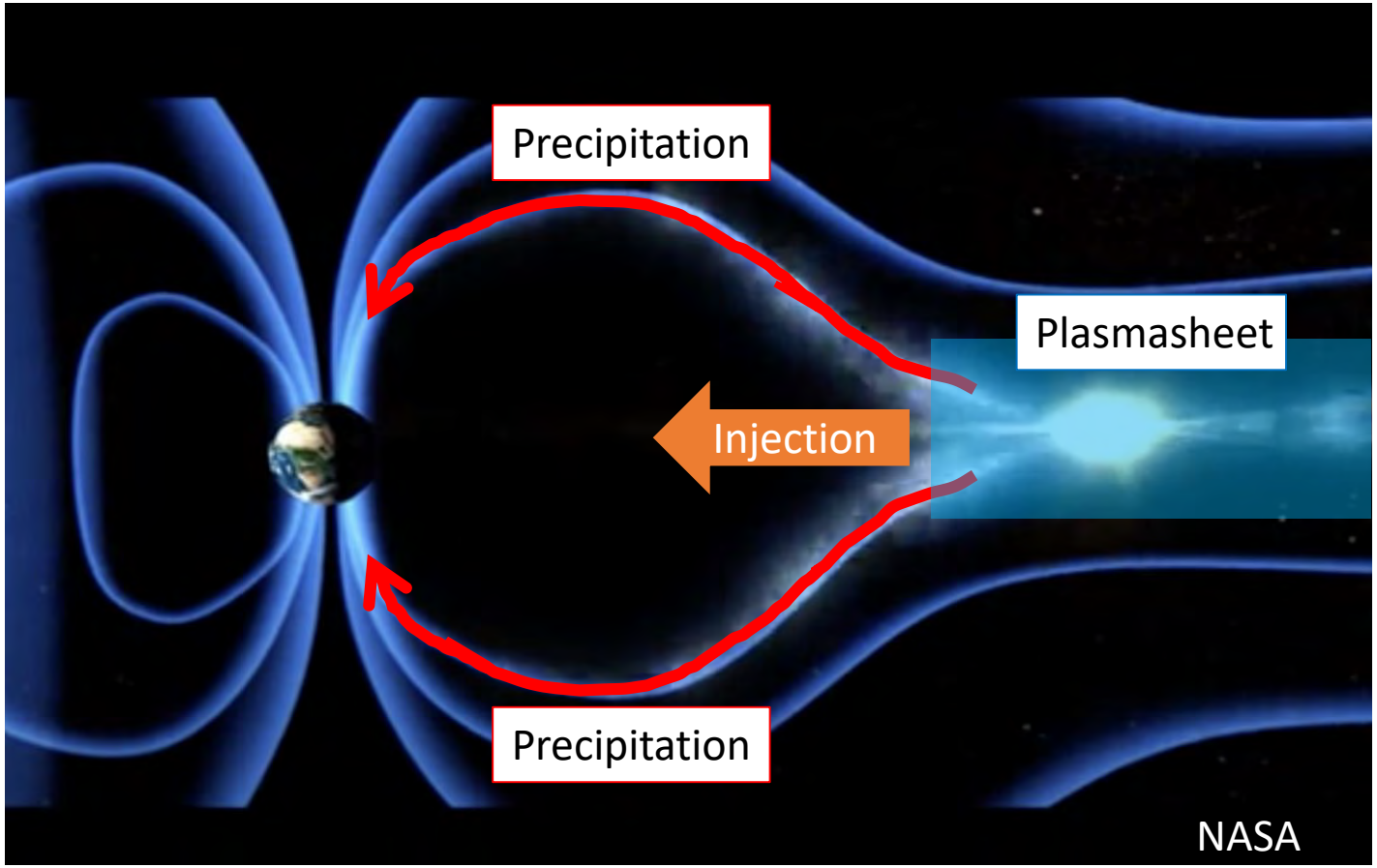
https://www.nict.go.jp/publication/shuppan/kihou-journal/journal-vol49no3/0301.pdf

Hot Electron precipitation from the plasmasheet

By the nightside reconnection, the hot plasma originated from the solar wind is populated in part in the nightside near equator. The region of the hot plasma is called the **plasmasheet.**

Hot electrons in the plasmasheet precipitate into the high-latitude atmosphere along the terrestrial magnetic fields when the magnetic fields reconnect at the nightside. **The precipitating hot electrons excite auroras in the high-latitude atmosphere of the Earth.**

The reconnection inject the hot electrons earthward across the terrestrial magnetic fields around the equator.



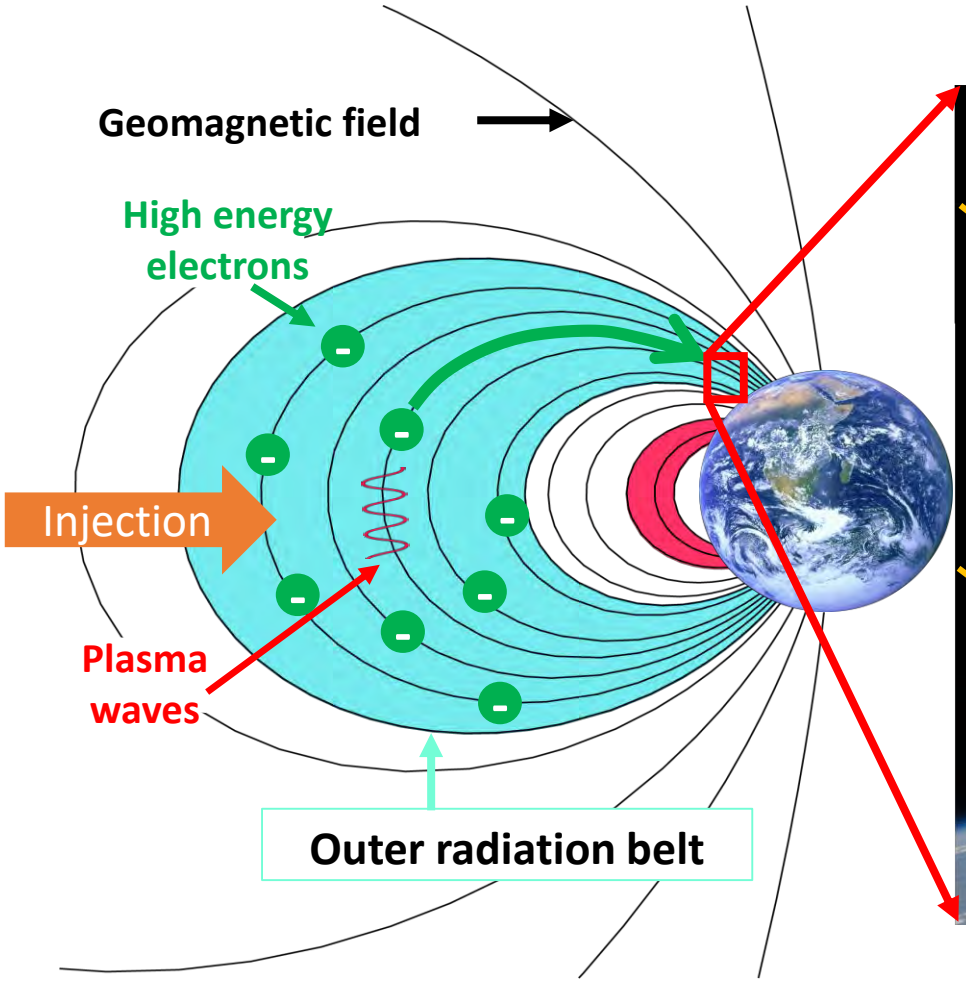
Hot plasma injection into the near-Earth space

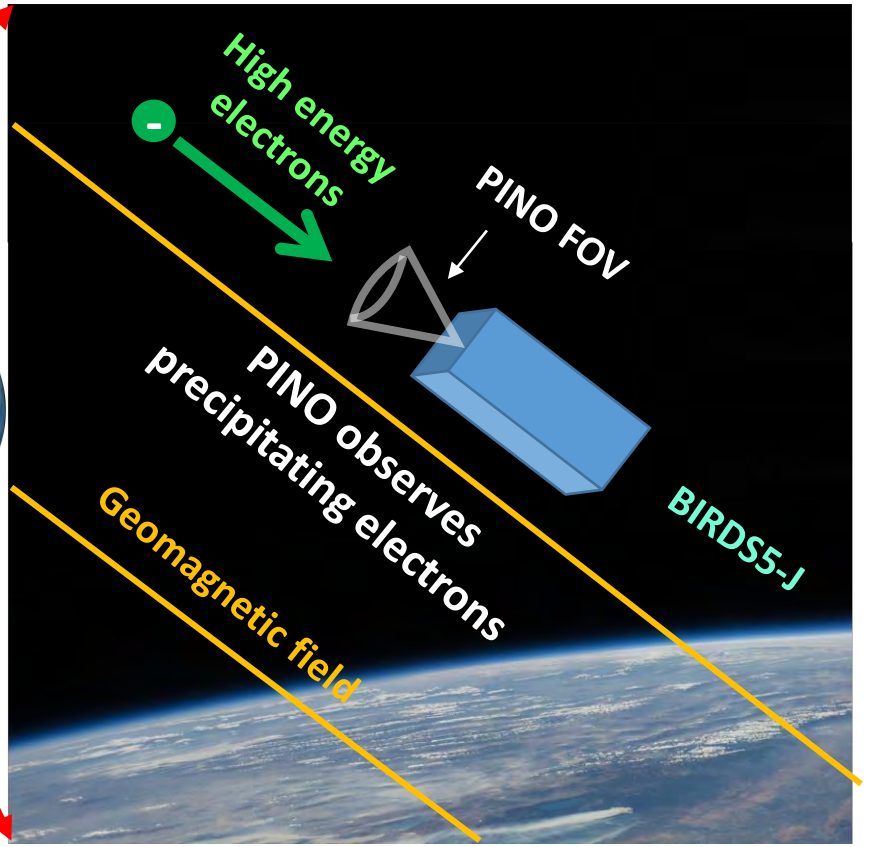
The injected hot plasma excites plasma waves around the magnetic equator in the near-Earth space.

The driven plasma waves scatter high energy electrons in the radiation belt. The high energy electrons precipitate into the mid-latitude atmosphere along the terrestrial magnetic field.

PINO will observe the precipitated high energy electrons.

(See *BIRDS Project Newsletter*, Issue No.58, Section 26, pages 96-100)



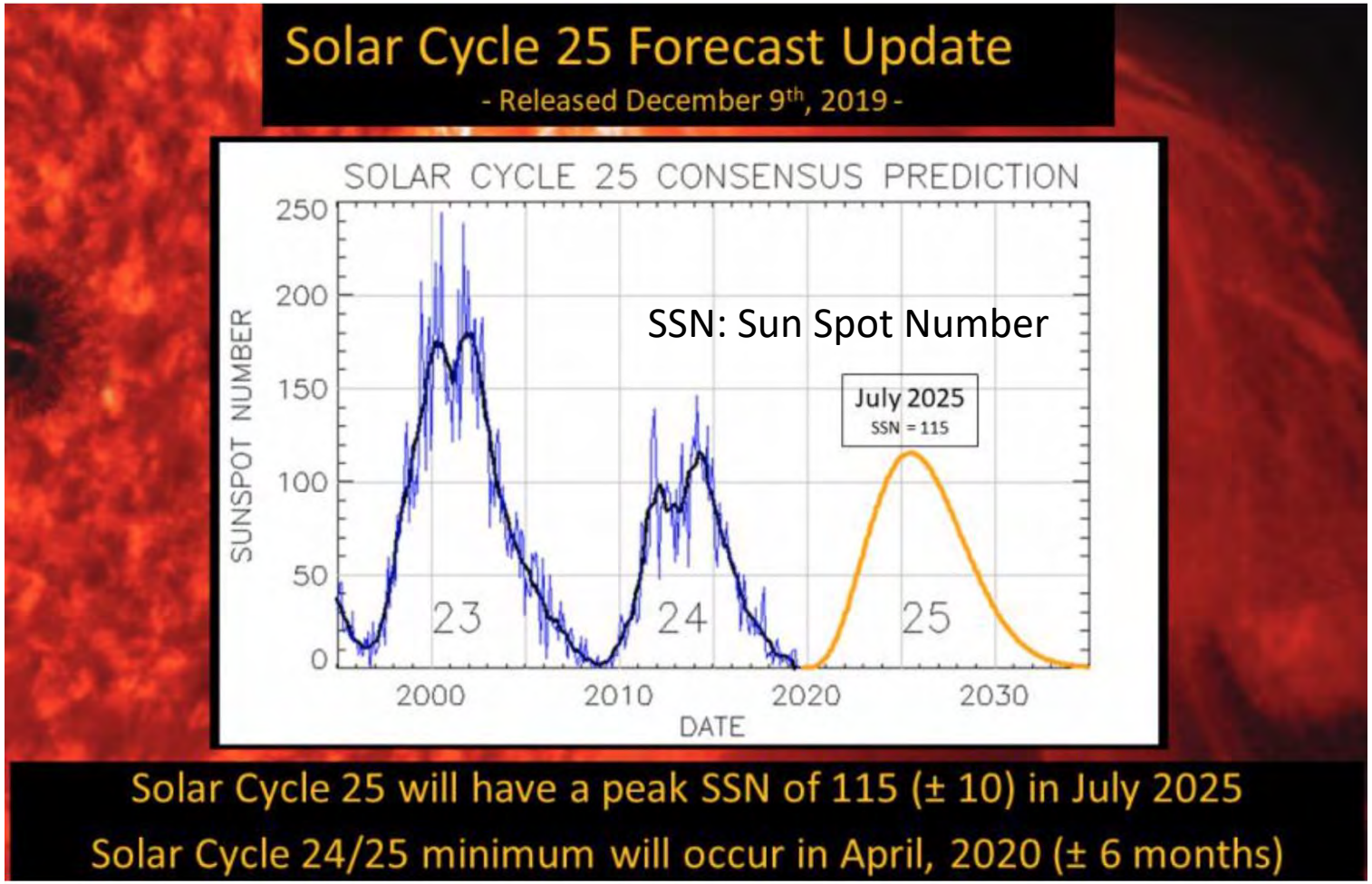


The new Solar Cycle has arrived !

The new solar cycle, **Solar Cycle 25, has begun since December 2019**. The Solar activity will increase until a solar maximum, predicted for 2025.

BIRDS-5 will be launched and operated during the increasing phase of the solar activity, which means that the magnetic storms will occur and hot electrons will be injected more frequently.

PINO may have many opportunities to detect precipitated high energy electrons.

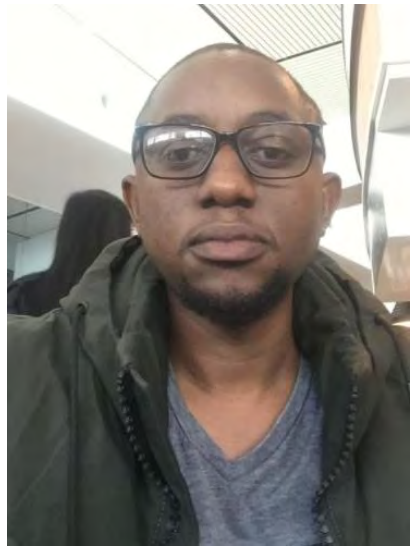


https://www.swpc.noaa.gov/news/solar-cycle-25-forecast-update

We can know the solar activity by measuring the sunspot number on the surface of the Sun.

End of this space weather article

BIRDS 5 Supply Chain Considerations and Availability of Space Qualified Hardware



By : Timothy Kudzanayi Kuhamba

Date : 30 November 2020

Understanding the Space Supply Chain

- Supply chain is the network of
    - companies
    - suppliers
    - manufacture and distribution of products to customers.

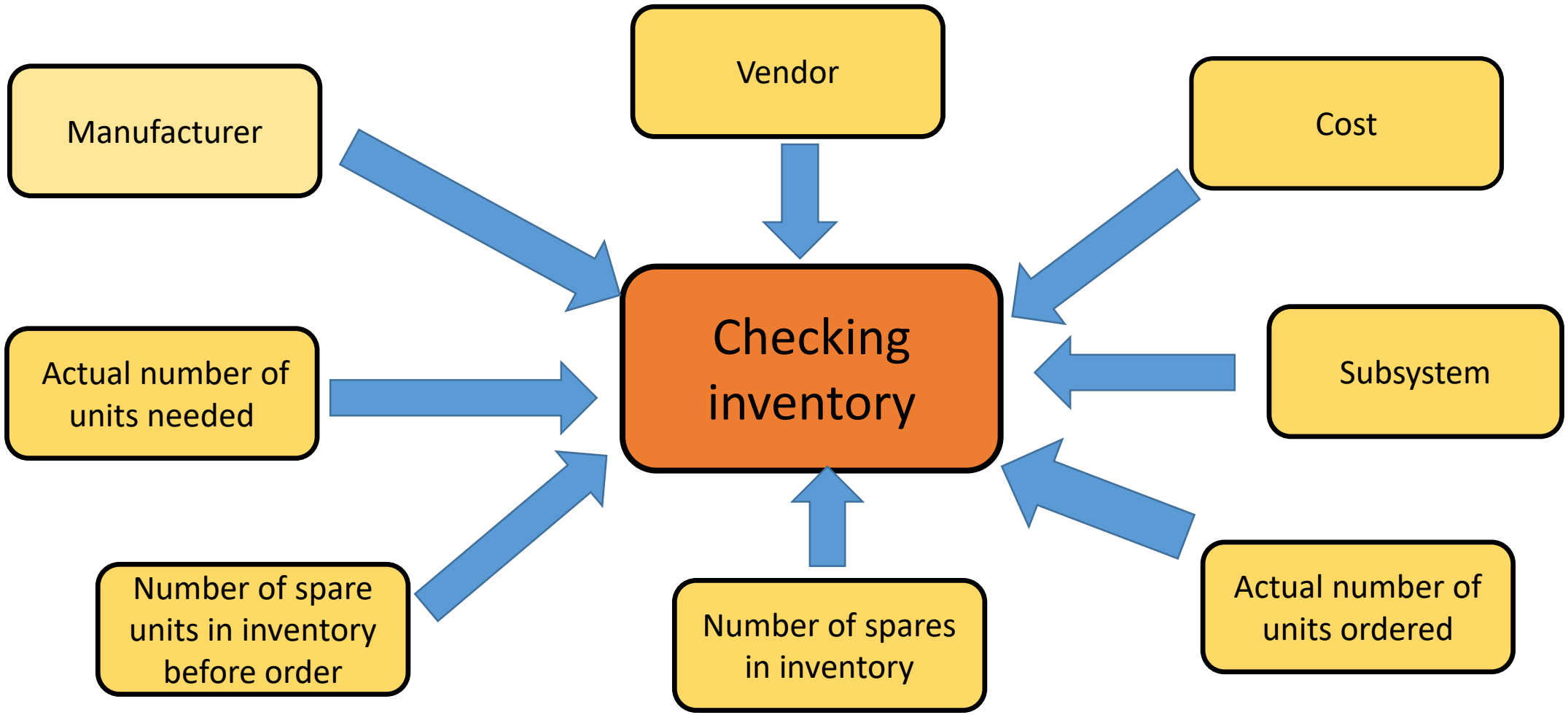
https://whatis.techtarget.com/definition/supply-chain

What does your supply chain look like?

- Do you have a number of suppliers ?
- Do you have many specialized suppliers ?
- Does the company have quality assurance that the parts go through thermal cycle tests and/or other qualification tests ?
- Do you have a good relationship with the suppliers ?

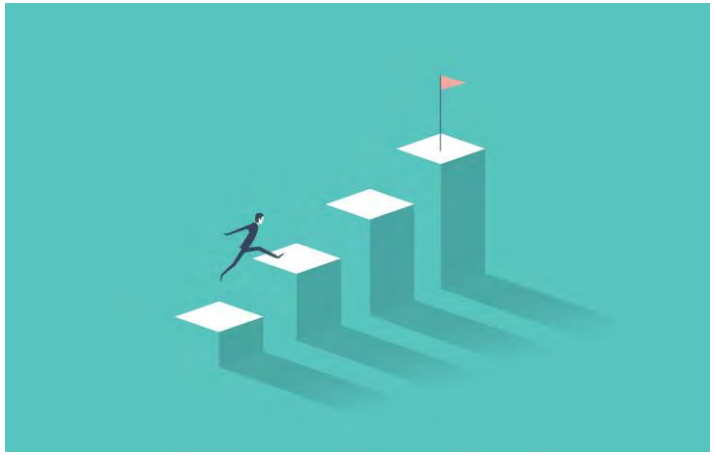
https://www.supplychainbrain.com/articles/30783-a-look-inside-a-space-systems-supply-chain
https://phillip-bailey.com/2018/03/11/supplier-management-one-voice/

Inventory


Manufacturer
Vendor
Cost
Actual number of units needed
Checking inventory
Subsystem
Number of spare units in inventory before order
Number of spares in inventory
Actual number of units ordered

Steps in Supply Chain of the BIRDS Project

- Checking the inventory of BIRDS program
- Seeking approval to purchase components
- Ordering components
- Product delivery.
- Assembling and Integrating components into subsystems
- Assemble subsystems into a final system
- Environmental Testing of the system
- Analysis of the environmental testing and approval upon successful testing
- Delivery of Satellite for launch



https://www.allbusiness.com/13-steps-successful-small-business-marketing-strategy-111173-1.html

BIRDS 5 Procurement

- BIRDS 5 team is working towards the Preliminary Design Review (PDR)
- BIRDS 5 members are procuring components to be used for the demonstration of different subsystems
- Different subsystems utilize Commercially Off the Shelf components (COTS)

Some of the COTS components procured

Factors Considered in Space Qualification

- BIRDS Heritage

← Official logos of the previous BIRDS projects from BIRDS-1 to BIRDS-4 (left to right)

- Space Flight Heritage
- Space environment testing some COTS components do not always function as expected
- Any change in product design, materials, exempts the product from being either space qualified or having space flight heritage

Quality assurance

http://rehucap.com/qualitys/

- BIRDS 5 members shall ;
  - Test, document and track any testing failures of COTS components.
  - Keep the failed parts
  - Record all failure and anomaly results for further references
  - Use failures to improve the design

Why is Supply Chain important?

- Failure to get components in time can result in delays of the project
- For an increased trust between the customer and supplier
- To understand the requirements of the customer

For instance, BIRDS project team entertain good relationships with companies supplying COTS parts of satellites, the trust permits constant work on further projects.

Moreover, COTS parts are delivered within 2 to 7 days depending on the availability.

https://www.forceintellect.com/2018/05/14/importance-of-supply-chain-management/

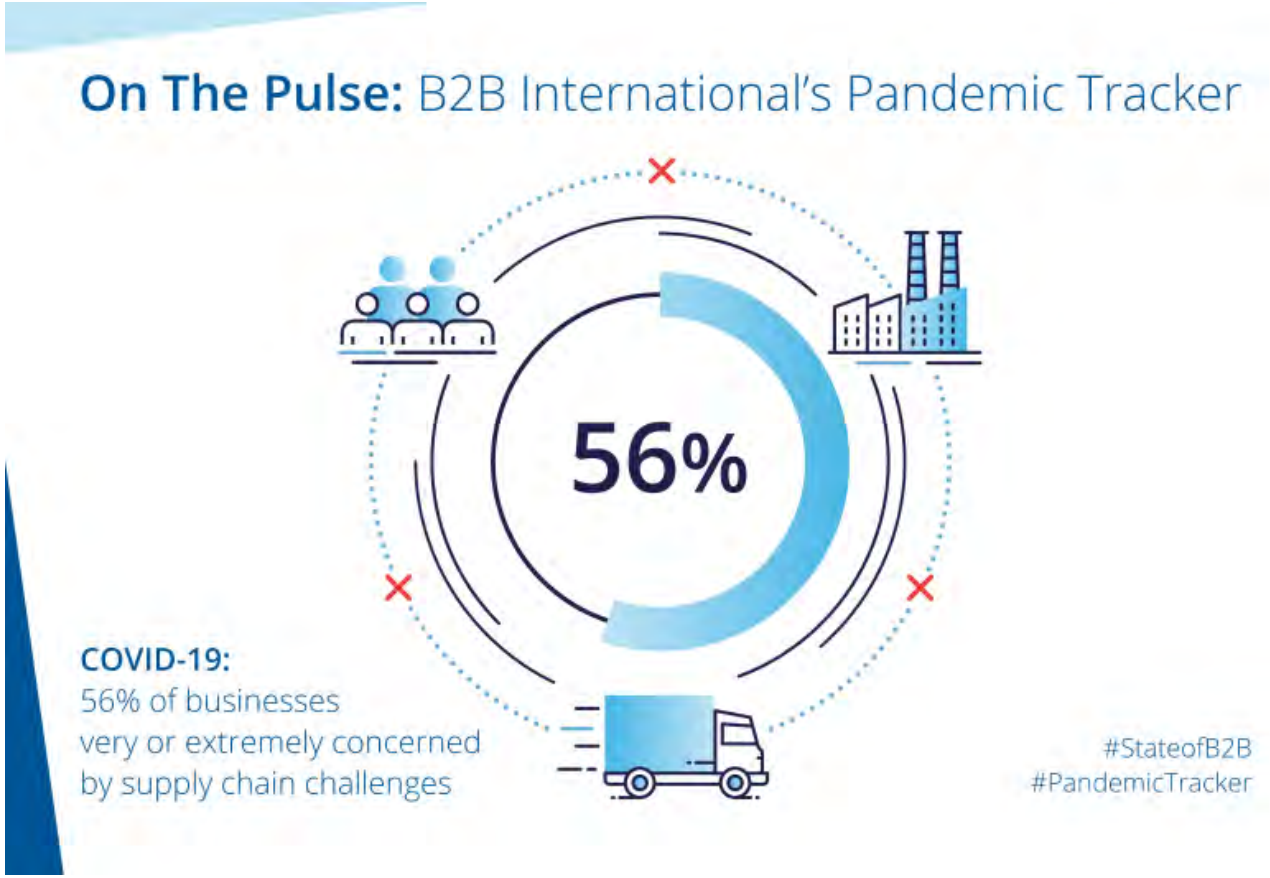
BIRDS program Supply Chain Challenges

- Some components require large orders which has an effect on the budget
- Unavailability of some components having an effect on the project timeline
- Incompatibility of some components during integration

https://www.fipp.com/news/coronavirus-media-challenges-opportunities/

Effects of COVID-19 on the Supply chain

- A ‘go-slow’ approach to lifting restrictions may reduce overall damages if it avoids the need for further lockdowns.
- Companies operating at half capacity.
- The project has not been affected by the COVID-19 in terms of the supply chain (yet)



https://www.nature.com/articles/s41562-020-0896-8
https://www.b2binternational.com/2020/04/29/covid-19-tracker-supply-chain-challenges/

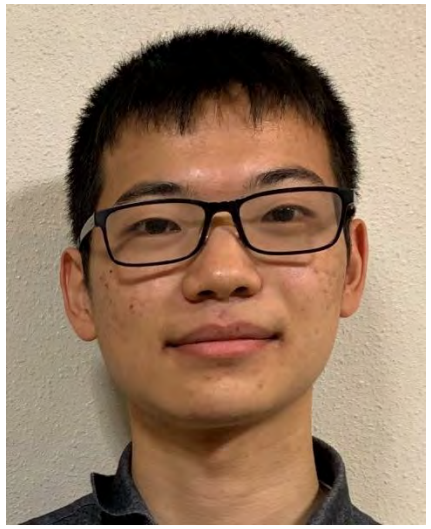
Factors BIRDS partners need to consider

https://www.123rf.com/photo_47682344_partnership-business-success-concept.html

- BIRDS team need to create relationships with companies that provide COTS for satellites
- Space heritage components (mostly for cubesats)
- Environmental testing

END OF THIS SECTION

My Teaching Practice



By: Yukihisa Otani

2 December 2020

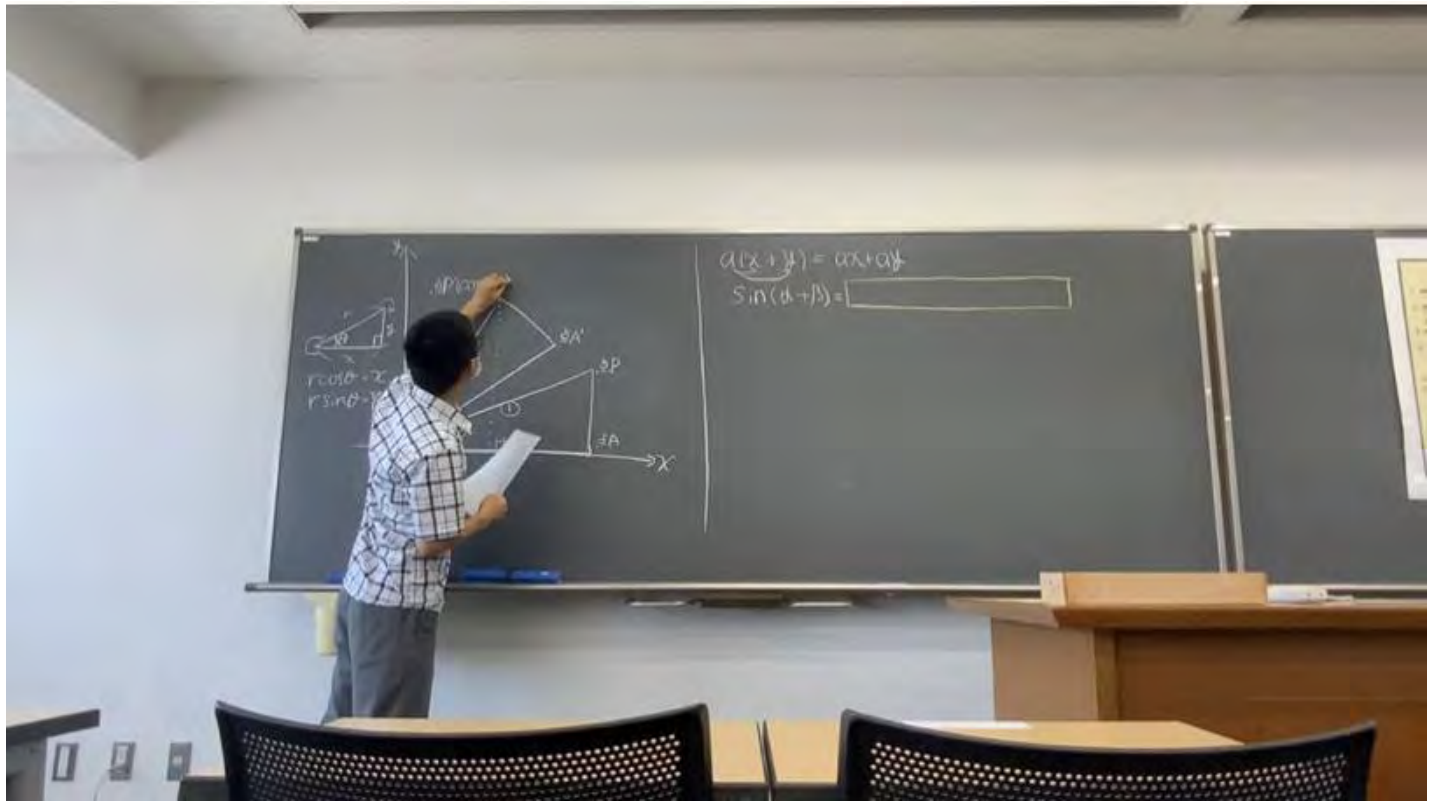
Teaching course at Kyutech

- In Kyutech, there are two major courses for teaching in high school : Industrial and Maths. I took both.
- I have learned about the educational psychology, student guidance and method, but also non-educational subjects such as sport, Japanese law and English.
- The total number of my teaching credit reached 87 !!!
- To finalize the courses, we had to go to real high schools and apply our freshly acquired skills.

Class	Credits
Mathematics	20
Engineering	20
Education	23
Other mathematics and engineering	16
Teacher license	8

Total: **87 credits** earned for the teacher license!!!

Preparing for a teaching practice



Picture 1. Practicing teaching at the school

7 準 備

①ホワイトボード ②ホワイトボードマーカー ③世界史・日本史教科書(資料集)

8 過 程

学習活動・内容	指導上の留意(手だて(○) 評価(◇))	形態	配時
1 数学の事象を把握し、本時のめあてを確認する			10
(1) 円の接線の式について確認する。	○「円の接線の式」について生徒に問うことで、円の接線を数式で表すことができたことについて確認する。	グループ↓全体	(4)
円の接線はどのような式になりますか どのような特徴がありましたか			
	○4人1グループになるように決め、机を動かすように指示する。 ○ホワイトボードとマーカーを配る ○ホワイトボードに描かれた円の図に接線を書き込み、特徴や気づきを示すように指示する。		
・半径に対して直角です ・いくつも接線を引くことができます ・交点は1つしかないです ・式は $ax + by = r$ になります	◇問いに対して積極的に取り組んでいる生徒を評価する。		
(2) 数学の事象を把握する。	○ホワイトボードに描かれた二次関数のグラフに接線を書き込むように指示する。	グループ↓全体	(4)
二次関数の接線の傾きはどうなりますか	○円の接線を求めた方法と同様の方法では、接線を表すことができないことを確認する。		
	◇問いに対して積極的に取り組んでいる生徒を評価する。		
(3) 本時のめあてを確認する。 16, 17 世紀の人たちが接線の式を求めたことだけを伝える。		一斉	(2)
二次関数の接線の傾きを求めよう。			
2 事象を数学的に表現して問題を設定・解決し、微分係数について理解する。			33
(1) 二次関数の接線の特徴について考える。	○接線にどのような特徴があるかを3人に問う。	個人↓全体	(3)
・軸に近づくと傾きが緩やかになります。 ・軸から離れると傾きが大きくなります。 ・傾きが一定ではありません。			
			
(2) フローチャートを基に「微分法」誕生の一説、過程について紹介する。		一斉	(10)

Picture 2. Class Plan Document (for the practice)

My time schedule on the Teaching Practice

Time	Detail
6:00	Waking up
6:45	Leaving for high school
8:15	Morning assembly for the teacher
8:45～16:45	**Class Tour, Teaching, Preparing**
16:50	Closing for the teacher
17:00	Evaluation meeting
17:30	Preparation for the next class
18:00	Class lock confirmation
18:30	Writing on the Diary
19:00	Leaving for home
20:30	Eating dinner & Preparing
25:00 (1 AM)	Sleeping

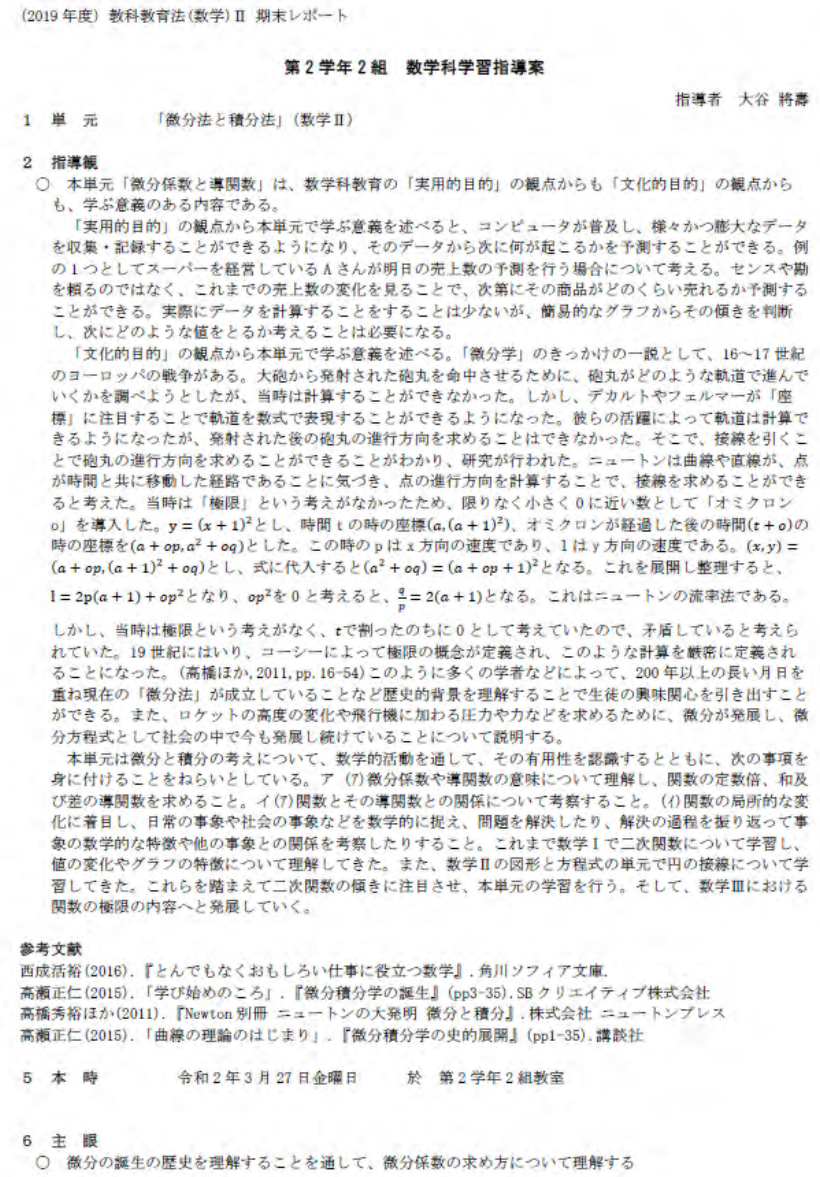
Time	Detail
8:25～8:40	HR morning assembly for the students
8:45～9:35	Preparing the class
9:45～10:35	Teaching trigonometry to the 2nd group
10:45～11:35	Making the next class plan document
11:45～12:35	Making the next class plan document
12:35～13:00	Eating lunch
13:00～13:15	Answering questions
13:20～14:10	Teaching trigonometry to the 3rd group
14:20～15:20	Making the next class notebook
15:20～15:45	HR closing for the students
15:50～16:40	Class Tour

Very Demanding and Tight Teaching Practice Schedule !!!

Preparing for the class

- Making the class plan document for the next class, is the hardest part of the training as it is constant and mandatory.
- The class plan document must include 3 topics:
  1. The Significance (1500words)
     (Why I teach trigonometry)
  2. The Dialogue (4 pages)
     (About all details shown on the blackboard and my explanations.)
  3. The board writing plan and student notebook plan

- Extra tasks
  1. Make the homework to be printed
  2. Make the test and answer the sheets.



(2019 年度) 教科教育法(数学) II 期末レポート

第 2 学年 2 組　数学科学習指導案

指導者　大谷 将壽

1　単　元　　「微分法と積分法」(数学 II)

2　指導観

○　本単元「微分係数と導関数」は、数学科教育の「実用的目的」の観点からも「文化的目的」の観点からも、学ぶ意義のある内容である。

「実用的目的」の観点から本単元で学ぶ意義を述べると、コンピュータが普及し、様々かつ膨大なデータを収集・記録することができるようになり、そのデータから次に何が起こるかを予測することができる。例の 1 つとしてスーパーを経営している A さんが明日の売上数の予測を行う場合について考える。センスや勘を頼るのではなく、これまでの売上数の変化を見ることで、次第にその商品がどのくらい売れるか予測することができる。実際にデータを計算することをすることは少ないが、簡易的なグラフからその傾きを判断し、次にどのような値をとるか考えることは必要になる。

「文化的目的」の観点から本単元で学ぶ意義を述べる。「微分学」のきっかけの一説として、16〜17 世紀のヨーロッパの戦争がある。大砲から発射された砲丸を命中させるために、砲丸がどのような軌道で進んでいくかを調べようとしたが、当時は計算することができなかった。しかし、デカルトやフェルマーが「座標」に注目することで軌道を数式で表現することができるようになった。彼らの活躍によって軌道は計算できるようになったが、発射された後の砲丸の進行方向を求めることはできなかった。そこで、接線を引くことで砲丸の進行方向を求めることができることがわかり、研究が行われた。ニュートンは曲線や直線が、点が時間と共に移動した経路であることに気づき、点の進行方向を計算することで、接線を求めることができると考えた。当時は「極限」という考えがなかったため、限りなく小さく 0 に近い数として「オミクロン o」を導入した。$y=(x+1)^2$とし、時間 t の時の座標$(a,(a+1)^2)$、オミクロンが経過した後の時間$(t+o)$の時の座標を$(a+op,a^2+oq)$とした。この時の p は x 方向の速度であり、1 は y 方向の速度である。$(x,y)=(a+op,(a+1)^2+oq)$とし、式に代入すると$(a^2+oq)=(a+op+1)^2$となる。これを展開し整理すると、

$1=2p(a+1)+op^2$となり、op^2を 0 と考えると、$\frac{q}{p}=2(a+1)$となる。これはニュートンの流率法である。

しかし、当時は極限という考えがなく、t で割ったのちに 0 として考えていたので、矛盾していると考えられていた。19 世紀にはいり、コーシーによって極限の概念が定義され、このような計算を厳密に定義されることになった。(高橋ほか, 2011, pp. 16-54) このように多くの学者などによって、200 年以上の長い月日を重ね現在の「微分法」が成立していることなど歴史的背景を理解することで生徒の興味関心を引き出すことができる。また、ロケットの高度の変化や飛行機に加わる圧力や力などを求めるために、微分が発展し、微分方程式として社会の中で今も発展し続けていることについて説明する。

本単元は微分と積分の考えについて、数学的活動を通して、その有用性を認識するとともに、次の事項を身に付けることをねらいとしている。ア (ア) 微分係数や導関数の意味について理解し、関数の定数倍、和及び差の導関数を求めること。イ (ア) 関数とその導関数との関係について考察すること。(イ) 関数の局所的な変化に着目し、日常の事象や社会の事象などを数学的に捉え、問題を解決したり、解決の過程を振り返って事象の数学的な特徴や他の事象との関係を考察したりすること。これまで数学 I で二次関数について学習し、値の変化やグラフの特徴について理解してきた。また、数学 II の図形と方程式の単元で円の接線について学習してきた。これらを踏まえて二次関数の傾きに注目させ、本単元の学習を行う。そして、数学 III における関数の極限の内容へと発展していく。

参考文献

西成活裕(2016).『とんでもなくおもしろい仕事に役立つ数学』. 角川ソフィア文庫.
高瀬正仁(2015).「学び始めのころ」.『微分積分学の誕生』(pp3-35). SB クリエイティブ株式会社
高橋秀裕ほか(2011).『Newton 別冊 ニュートンの大発明 微分と積分』. 株式会社 ニュートンプレス
高瀬正仁(2015).「曲線の理論のはじまり」.『微分積分学の史的展開』(pp1-35). 講談社

5　本　時　　令和 2 年 3 月 27 日金曜日　　於　第 2 学年 2 組教室

6　主　眼

○　微分の誕生の歴史を理解することを通して、微分係数の求め方について理解する

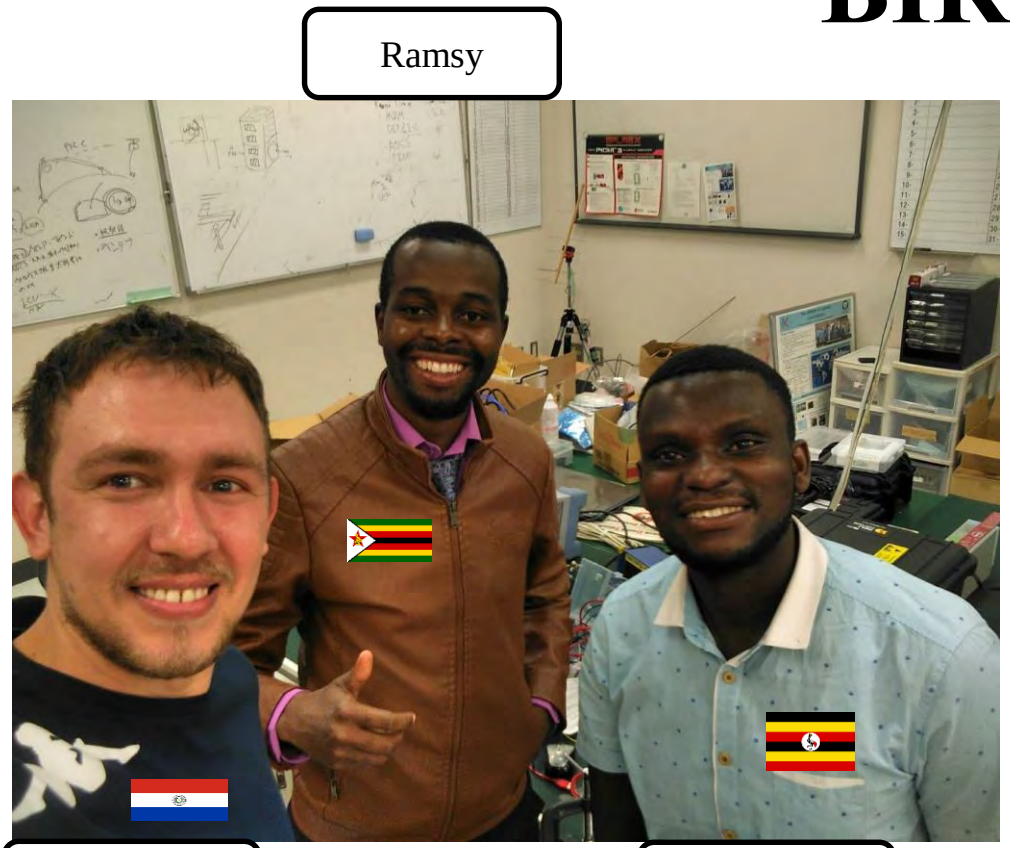
Picture 3. Class Plan Document (for the practice)

Impressions

- This teaching practice was very hard, and I may have faced some strong challenges, however, this experience was also the most fruitful that I had as it made be better in so many ways.
- At the last HR closing for the student, I received a very special present from my students (left side of this page)!
- I asked them how were they able to draw my face as I was always wearing a mask. The surprising answer was that they “searched for “Otani Kyutech” on the Internet!!” and were able to find it.
  Contemporary students are great!!!

END OF THIS SECTION

BIRDS Heritage



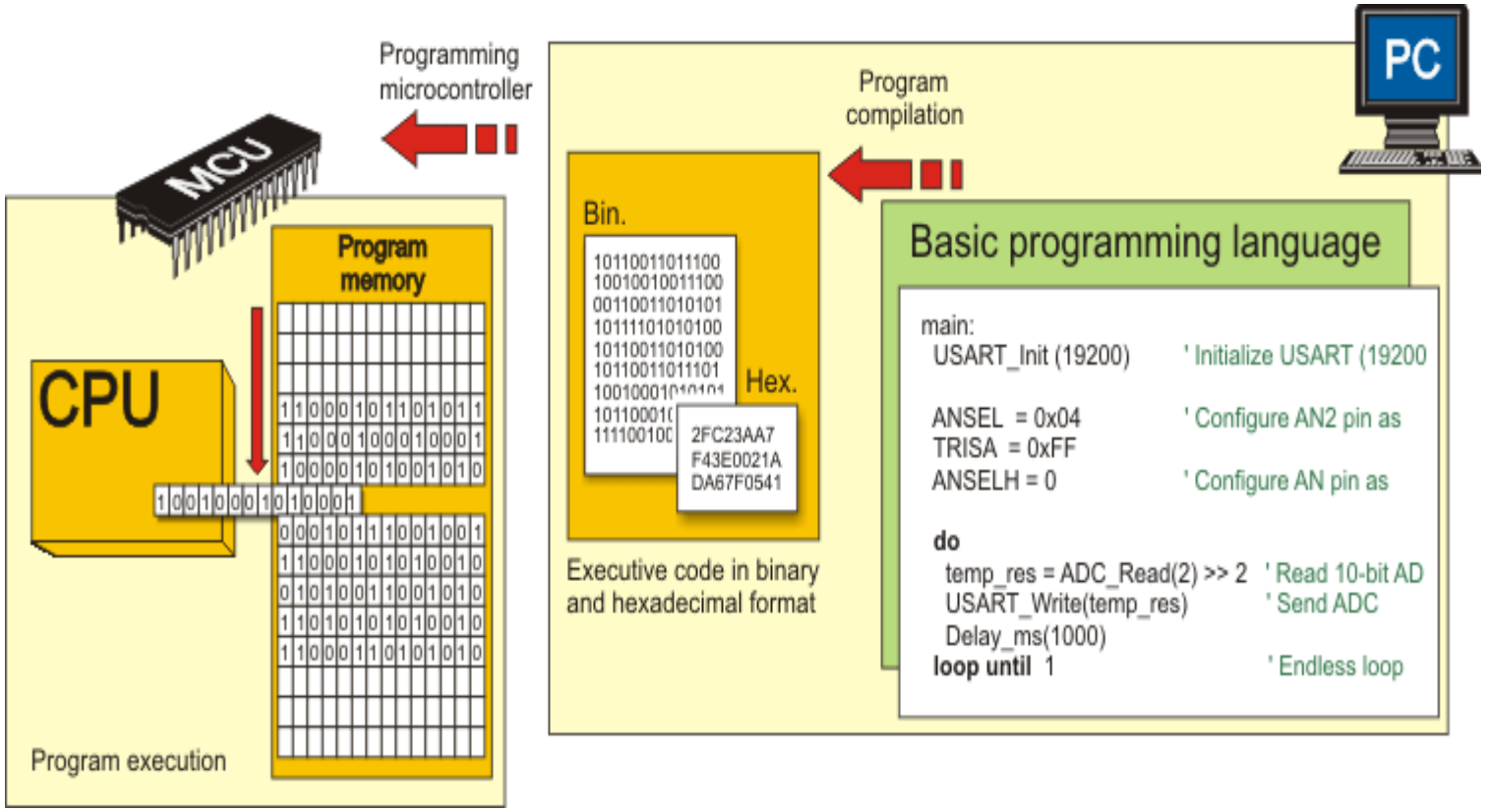
By : Ramsy

Date: 04/DEC/2020

Lessons Learnt from Adolfo

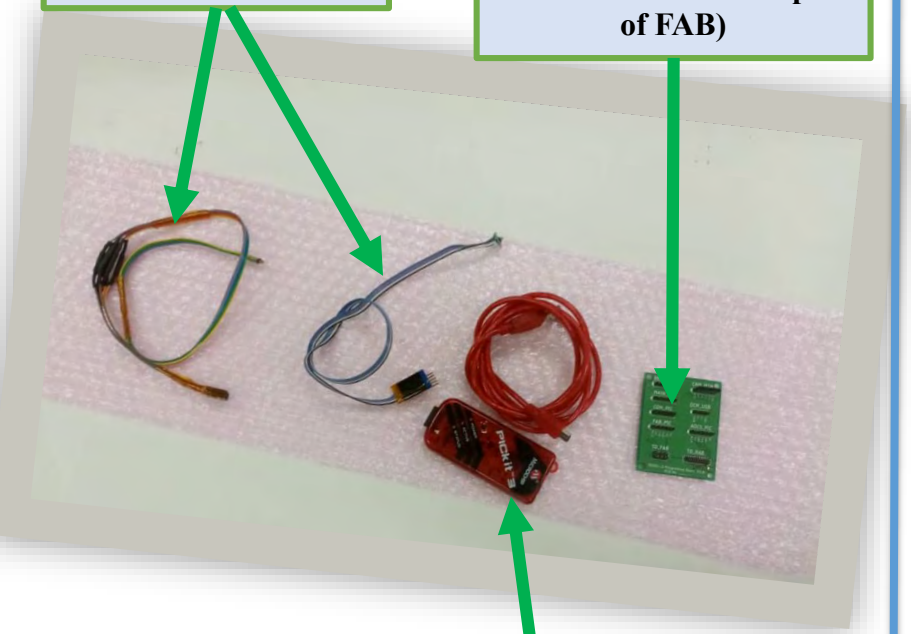
[PIC Programming]

1) COMM PIC 16F1789
2) MAIN PIC 18F67J94
3) RESET PIC 16F1789



https://www.mikroe.com/ebooks/pic-microcontrollers-programming-in-basic/programming-languages

Important Tools for Programming

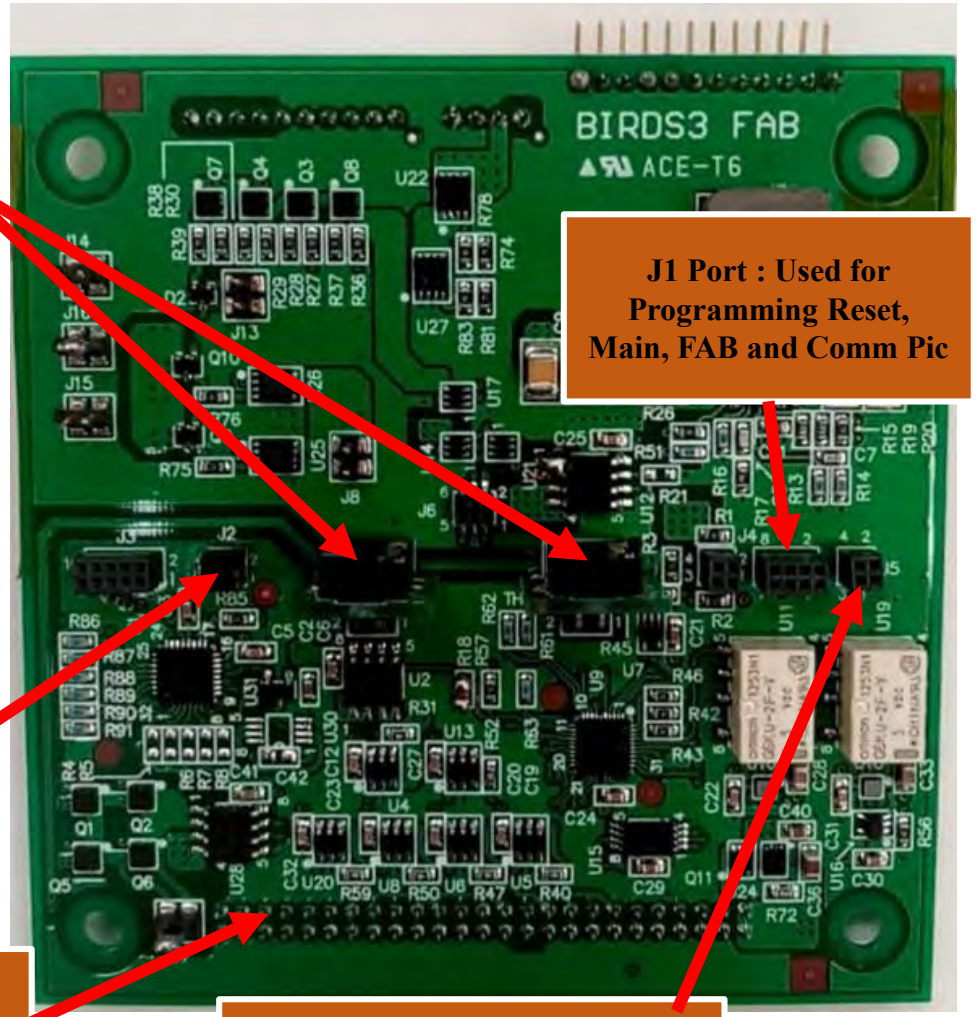


Connectors (Some)

Programming Board (interface PICkit with different PICS via J1 port of FAB)

The PICkit 3 programmer/debugger is a debugger system for Microchip MCUs programming.

FAB board



RBF 1 and 2: For safety, Removed by Astronauts at ISS before flight, Cuts power supply between battery and all satellite circuitry

J1 Port : Used for Programming Reset, Main, FAB and Comm Pic

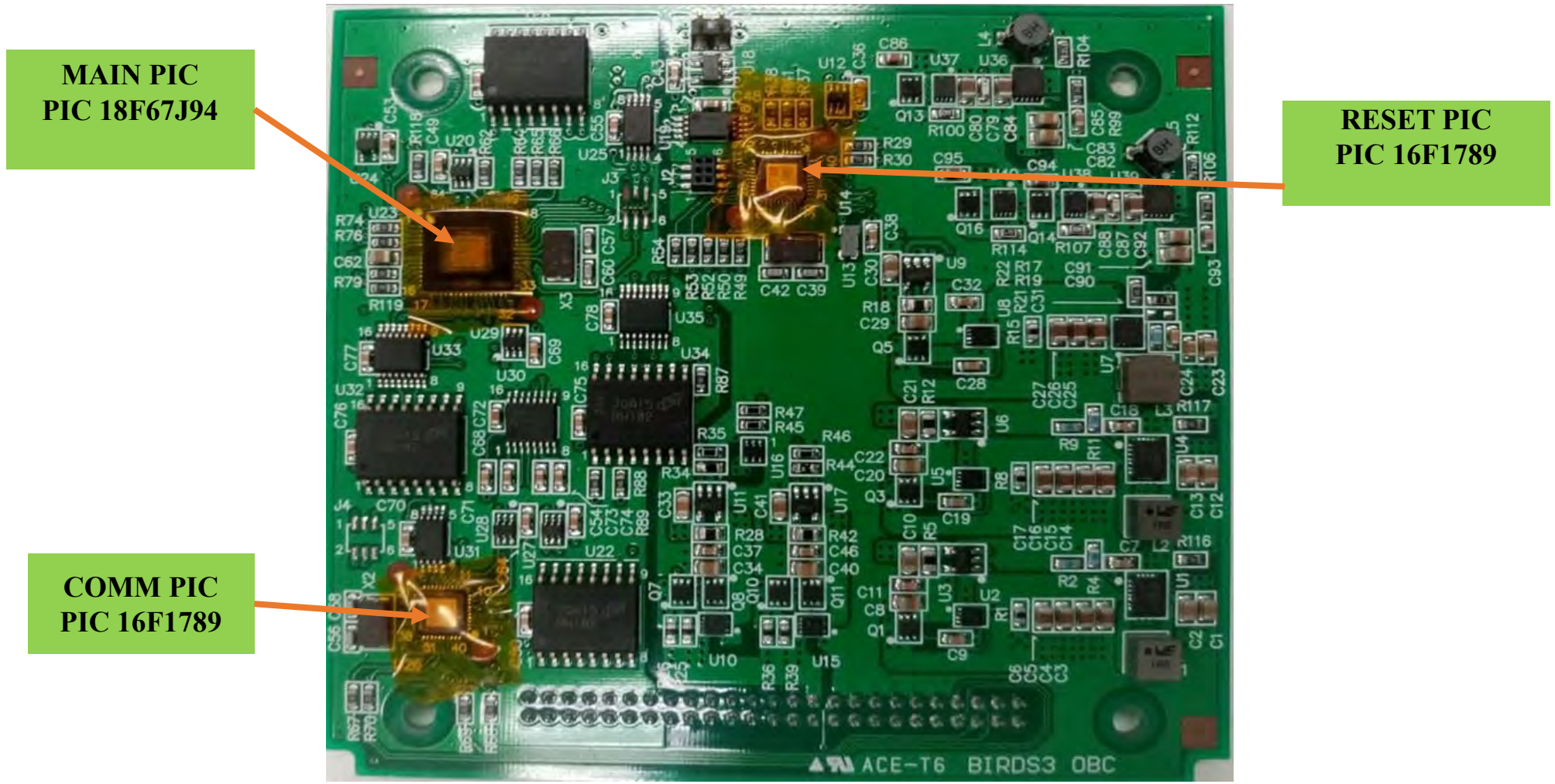
J2 Port : Used for debugging, Program Main Pic

50 Pin Connector

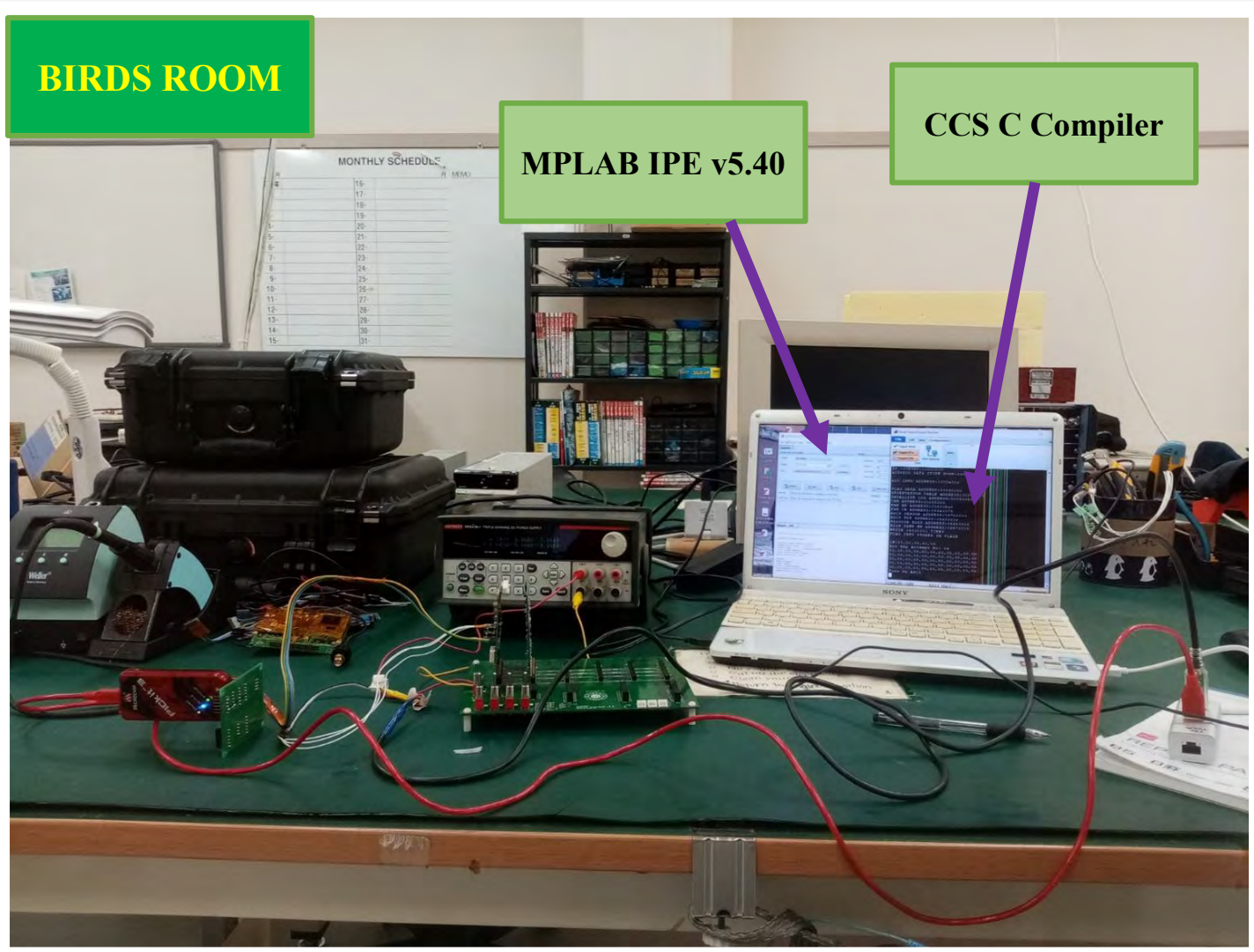
J5 Port : For Battery Charging when Satellite is assembled

Important Tools for Programming

OBC (Onboard Computer)



Complete Set Up



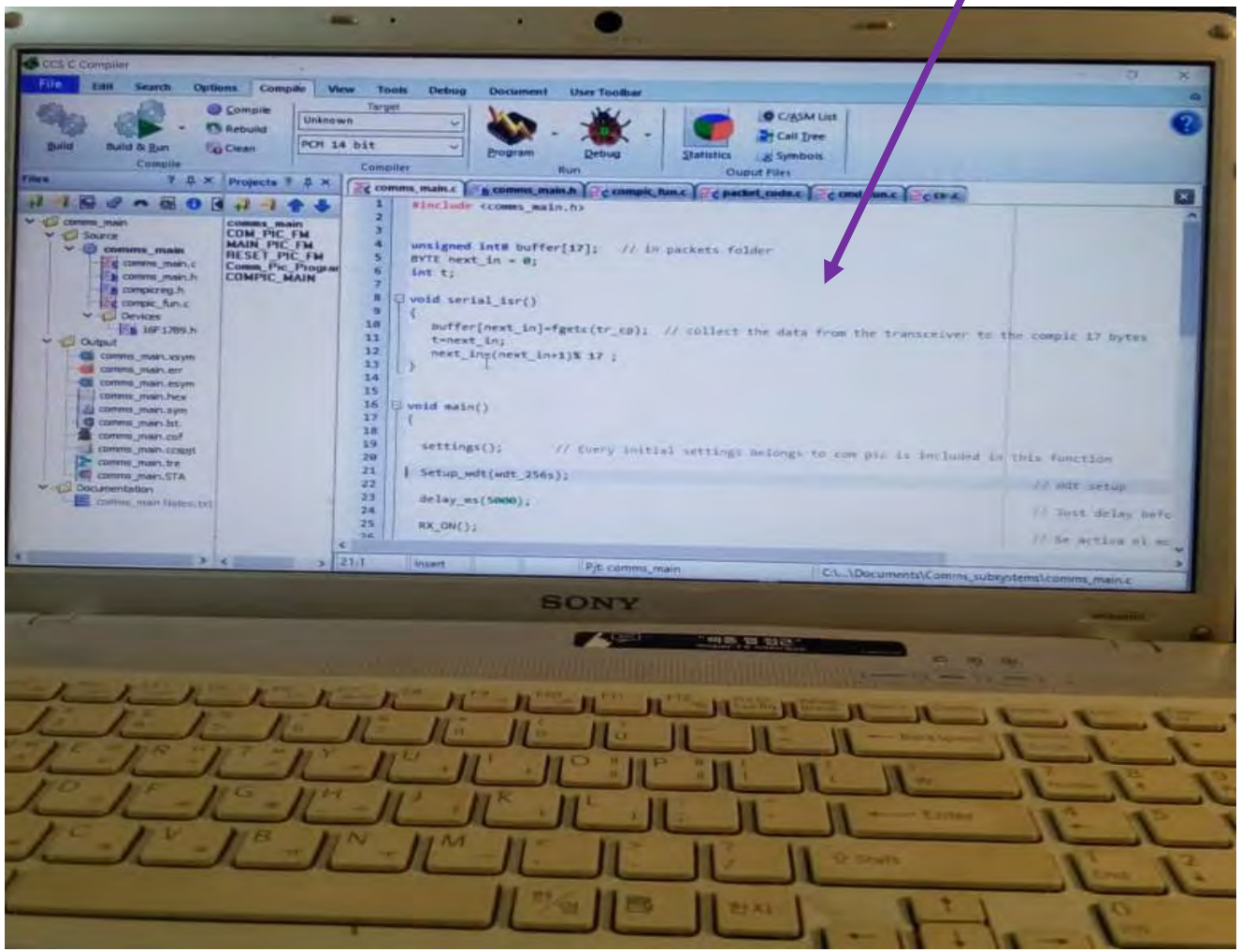
Tasks

1. **Install and uninstall programs from:**
   - ❑ **Main Pic**
   - ❑ **Reset Pic**
   - ❑ **Comm Pic**
   - ❑ **FAB**

   Use MPLAB IPE, Picket 3, and programming board
2. **Interface of the FAB with programming board, PICKit 3 and PC**
3. **Program the PICS using CCS C compiler**

Software used for PIC Programming

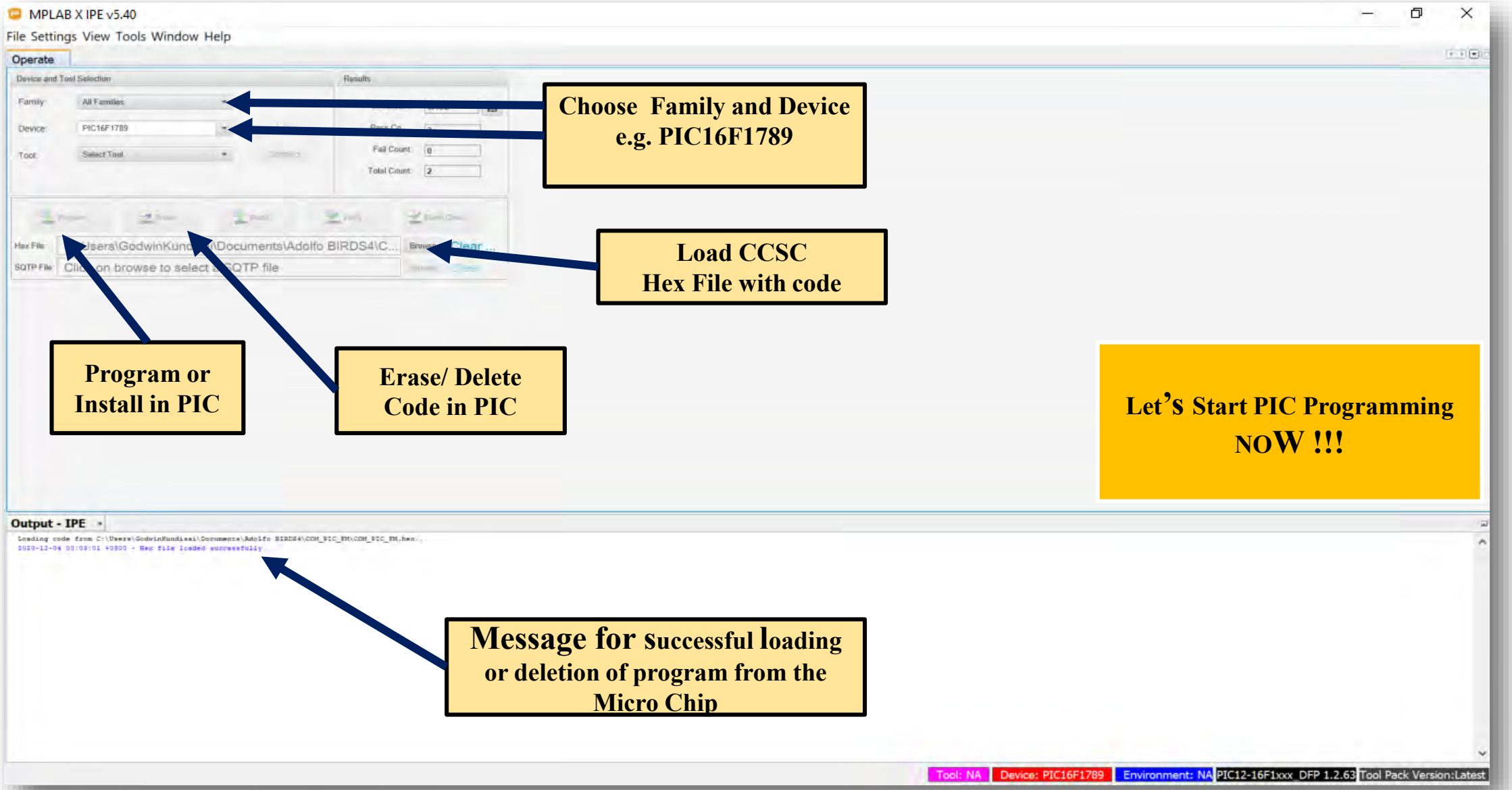
CCS-C Compiler



Steps to Create a New Project in CCS-C

- ✔ File=> New> Project Wizard
- ✔ Save name with ccspjt file extension
- ✔ Device=> Select Family Device => Device Name eg PIC18FJ6794 for Main Pic
- ✔ Set clock type and speed (optional) or set in the code.
- ✔ Create Project and Start coding
- ✔ Make use of Help in case of challenge
- ✔ Use serial monitor on Tools to ensure you are connected to your device and to check your code output

MPLAB IPE v5.40



Japanese astronaut Noguchi

By : Takashi Oshiro

2020/Dec/9

Noguchi left Earth 3 times

- **15th Nov 2020** : Falcon-9, developed by SpaceX was launched successfully.
- Falcon-9 carried a spacecraft called **CrewDragon** with 4 astronauts in it : **Michael Hopkins, Victor Glover, Shannon Walker** and **Noguchi Soichi.**
- The CrewDragon was also developed by SpaceX in a way that it can accommodate a maximum of 7 astronauts.
- Japanese astronaut Noguchi has been to the ISS 2 times and this launch is his 3rd experience of an ISS mission.

Soichi noguchi v2 - Soichi Noguchi - Wikipedia

KSC-20180726-PH_SPX01_0001 | In this illustration, a SpaceX … | Flickr

His profile

Noguchi Soichi (野口 聡一)

Year	Personal history
1996	Selected as an astronaut candidate
1998	Certified as an astronaut
2005	First space flight Participated in the STS-114 mission by the Space Shuttle Discovery.
2009	Second space flight Stayed at the ISS for about five and a half months, and installed a child arm of the "Kibo" Japanese Experiment Module robot arm and conducted experimental operations.
2020	Third space flight Planned to stay on the ISS for half a year as a long-term ISS crew on board of the Crew Dragon spacecraft (first operation) (Crew-1).

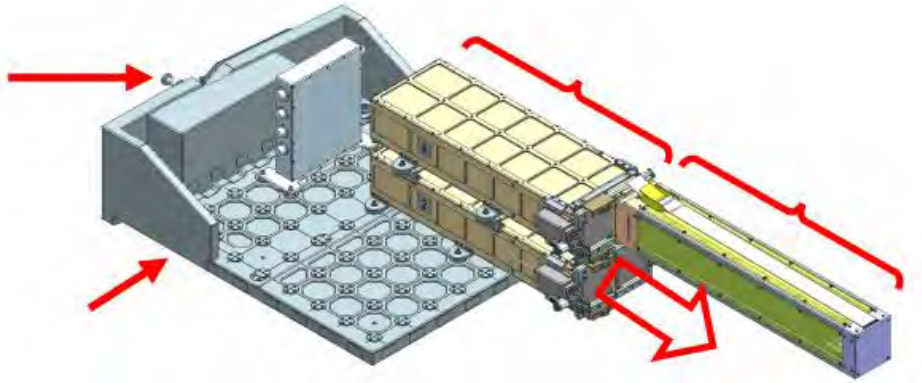
noguchi_presskit_a.pdf (jaxa.jp)

Microsatellite release mission (J-SSOD)

- One of the missions which is supposed to be conducted by Noguchi is the Microsatellite release mission.
- J-SSOD is developed for microsatellite deployment. The newly developed release mechanism (J-SSOD-R) will increase the number of satellites that can be released from the conventional 6U to 24U, and will allow astronauts to load satellites in orbit.

※1U CubeSat: 10cm x 10 cm x 10cm

BIRDS-3 deployment



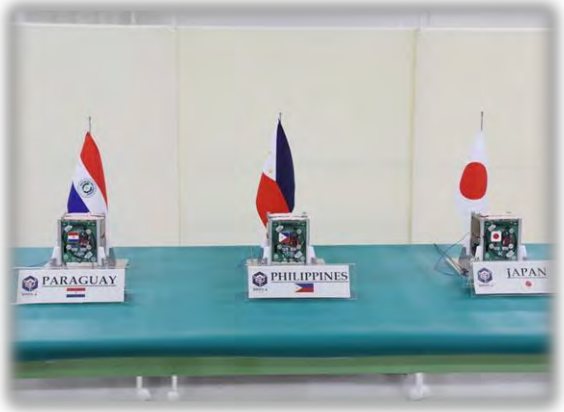
J-SSOD-R

noguchi_presskit_a.pdf (jaxa.jp)

History of Satellite deployments from Kibo

2015/2	Released Brazil's first microsatellite (AESP-14).
2016/4	Released "DIWATA-1", the first domestic satellite in the Philippines.
2017/6	As a satellite development and operation project (BIRDS) organized by Kyushu Institute of Technology, we released microsatellites (5 satellites) developed by students from each country (Ghana, Mongolia, Bangladesh, Nigeria, Japan).
2018/4	Based on the cooperation between JAXA and the United Nations Office for Outer Space Affairs (KiboCUBE), Kenya's first microsatellite (1KUNS-PF) was released.
2018/8	As part of the BIRDS project (second time), we released three microsatellites developed by international students from Bhutan, the Philippines, and Malaysia.
2019/6	As the BIRDS project (third time), we released three microsatellites developed by international students from Nepal, Sri Lanka, and Japan.
2019/11	Released a microsatellite (RWASAT-1) developed with the University of Tokyo for the purpose of developing human resources and improving technical capabilities in Rwanda.
2020/3	Guatemala's first microsatellite (Quetzal-1) was released as the second time based on the cooperation between JAXA and the United Nations Office for Outer Space Affairs (KiboCUBE).
First half of 2021 (planned)	As the BIRDS project (fourth time), we plan to release three microsatellites developed by students from the Philippines, Paraguay and Japan.

- This table shows the actual release of major overseas satellites.
- Our BIRDS satellites have been deployed many times. Next year, BIRDS-4 satellite are supposed to be released from ISS.

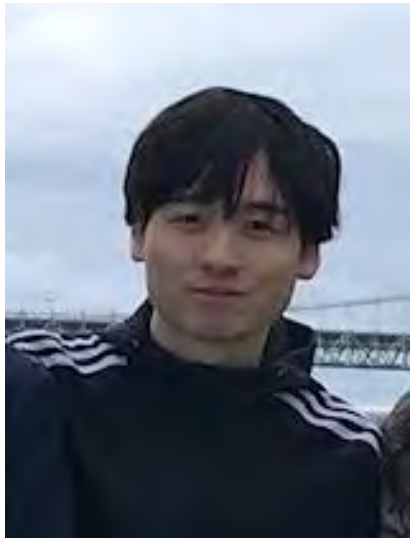


BIRDS-4 satellites

noguchi_presskit_a.pdf (jaxa.jp)

END OF THIS SECTION

Self-introduction



By: Tomoya Iwase

Date: 9 December 2020

About me

- Name : Iwase Tomoya
- Age : 22 years old

  (Born : 1998/07/22)
- My hometown : Fukuoka city
- Motto : Keep things simple

Why do I want to participate in BIRDS-5 project ?

- I majored in Mechanical and Space Systems Engineering and I was fascinated by space development.
- My goal is to develop satellites that greatly supports the information society from the sky.

Previous Activity (1)

- Dance club “BraveCrew”

I’m a member of a dance club called “BraveCrew” and I’m its captain this year.

Dancing is a one of my hobbies. We usually practice once a week in the campus.

Once a year, we perform on the stage of the school festival. (Unfortunately, this year's event has been cancelled due to COVID-19.)

Previous Activity (2)

- Language Lounge Supporter

As a member of the supporters, I planned events several times a year.

- DEAGLE

As a systems engineer, I participated in the launch of a drone project.

Self-introduction

By : Fukudome Shoma

2020/12/02

Who am I ?

NAME : Fukudome Shoma

BIRTHDAY : December 5th

Third year university student

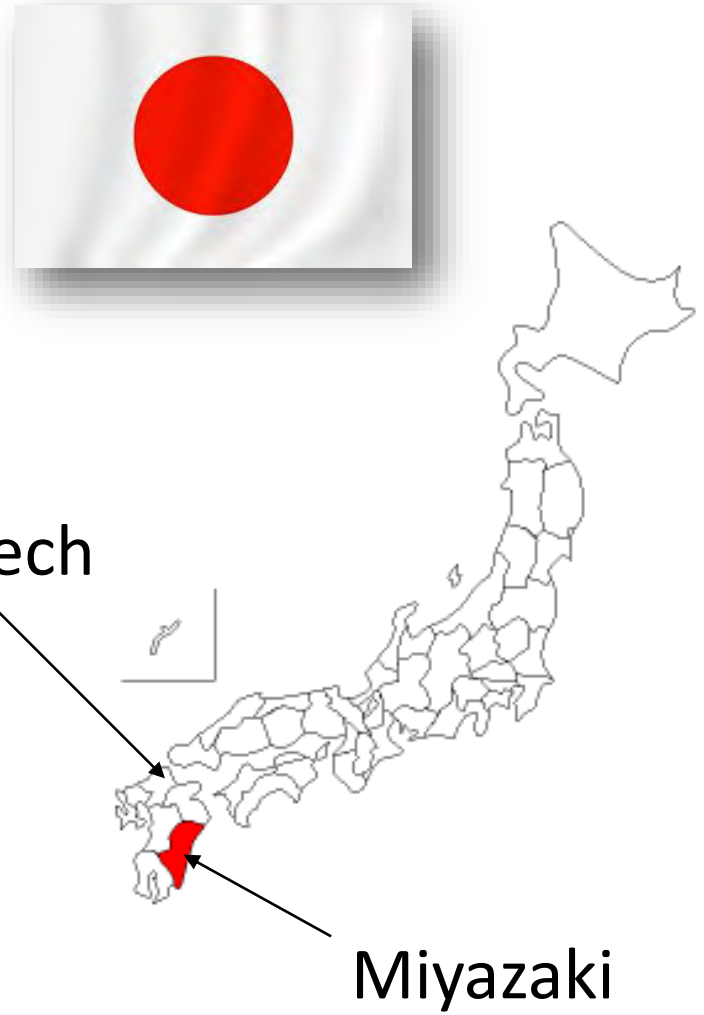
I am from Miyazaki Prefecture in Kyushu.

I got transferred from Miyakonojo-KOSEN and I enrolled Kyutech this April (2020).

HOBBIES :

I was in a tennis club when as a KOSEN student and I am fond of it.

I also like traveling especially by train.



About Miyazaki Prefecture

Miyazaki is located at the southeastern side of Kyushu and it is famous for its beautiful ocean view.

Since Miyazaki is surrounded by lots of mountains, it is a little difficult to reach from Fukuoka.

Chicken Namban is also from Miyazaki and I love it.

Sanmesse Nichinan
(Miyazaki pref.)

Chicken Namban

Academic Background

What are KOSEN ?

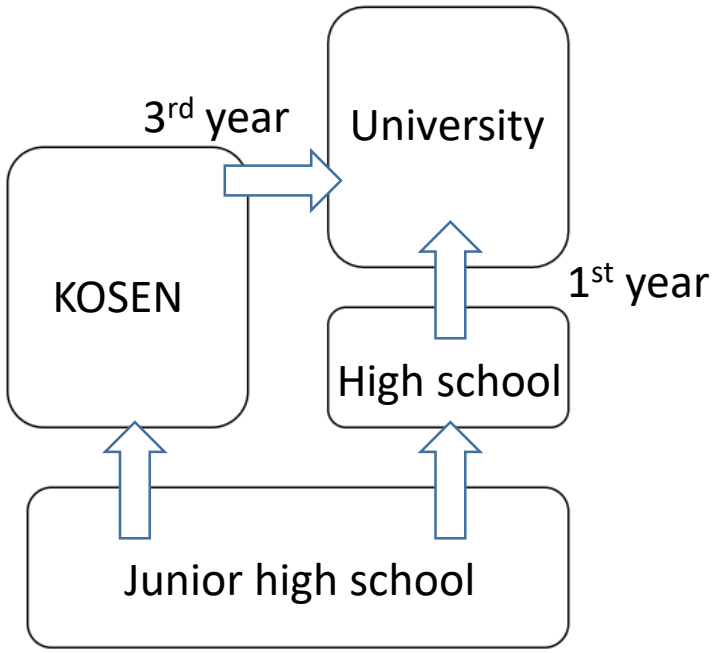
KOSEN are Japanese institutes of higher educational institution.

They accept students who graduated from junior high school.

We learn about engineering there for 5 years and after graduation, some start to work and some transfer to university as 3rd year students like me.

My major was electric and computer engineering and I was a member of KOSEN programming contest.

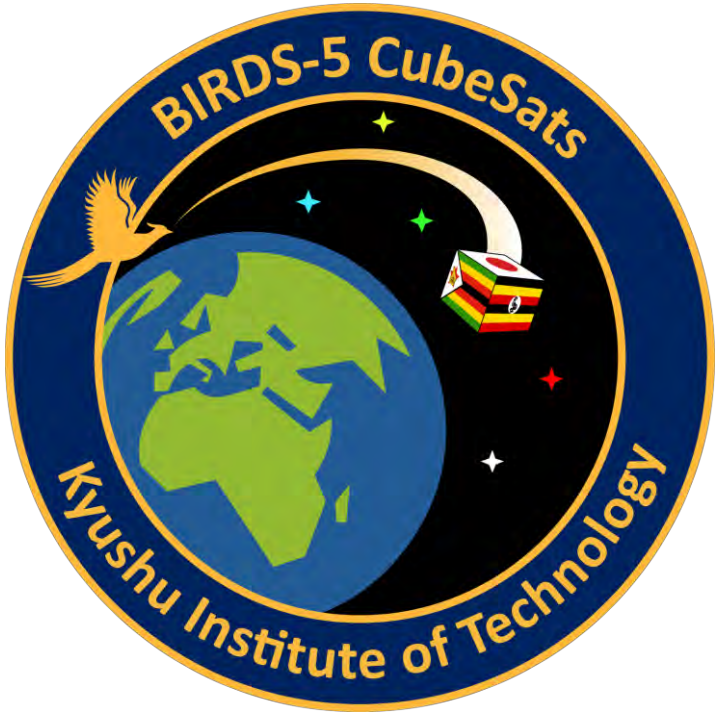
都城工業高等専門学校



The KOSEN route and the high school route

End of BIRDS-5 reports for this month.

Thanks to Fahd for the compilation work.
- Editor



STAMINA SPACE

PHL MICROSAT

UPDATES FROM THE PHILIPPINES

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

PREPARED BY:

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"Pista ng Mapa"

Space and Ground Data for the Betterment of Human Condition

November 20, 2020

Panji Brotoisworo, one of the researchers from our Ground Receiving, Archiving, Science Product Development and Distribution (GRASPED) team, presented about Open-source DInSAR software for monitoring ground deformation using radar satellites.

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

Diwata-2 Data Camp

December 10-11, 2020

Diwata-2 Data Camp was a three-day online workshop covering the following topics:

- Introduction to optical satellite remote sensing
- Introduction to Diwata payloads
- Diwata-2 data processing

The training discussed the applications that can be derived from optical satellite data, specifically Diwata-2 data. The participants were taught how to utilize Diwata-2 images for land cover mapping, benthic habitat mapping, and change analysis.

Class picture! Participants of the Diwata-2 Data Camp

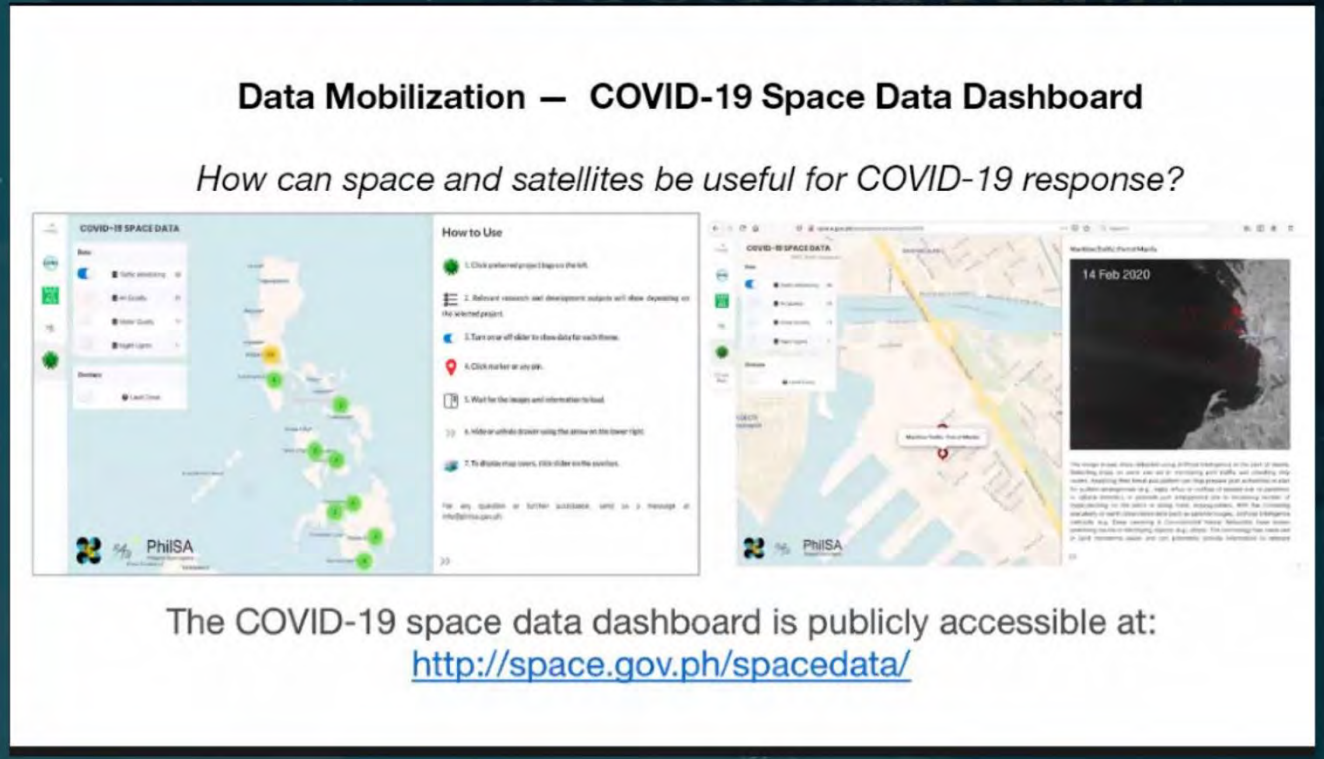
4th UNISEC-Global Meeting

December 12, 2020

UNISEC-Philippines has been invited as a resource person during the 4th UNISEC-Global Meeting and extended the invitation to stakeholders.

The Philippine Space Agency (PhilSA) took the opportunity, and Mr. Edgar Paolo Violan from the Office of the Director General presented a brief background on the organization and its activities to this global platform.

Mr. Edgar Paolo Violan presented the COVID-19 space data dashboard



Space Serye :

"The development of small satellites in the Philippines, and the country's future in space program"

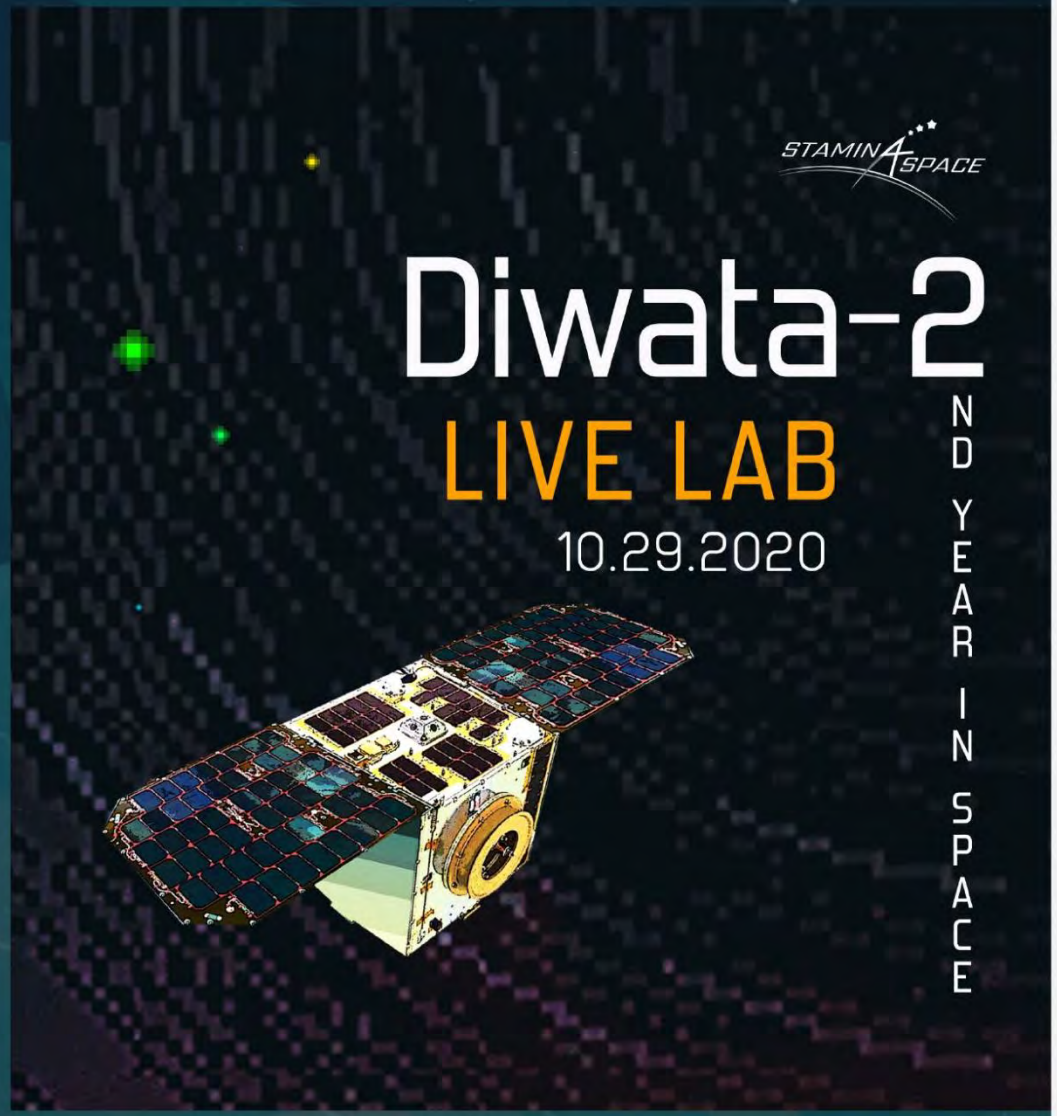
December 13, 2020

STAMINA4Space PHL-50 University Researcher Engr. Delburg Mitchao was invited to the Space Serye's 8th episode to discuss how it was like developing the country's first microsatellites. He was heavily involved in Diwata-1 and Diwata-2 as a thermal subsystems engineer.

He appears at 20:50 onwards. Check it out here: https://bit.ly/3oN7ZQF

Diwata-2 Live Lab

The Diwata-2 Live-Lab presentations are already uploaded in the STAMINA4Space YouTube Page: https://bit.ly/3gsEjW5



1 Diwata-2 Live Lab - OPTIKAL
STAMINA4Space

2 Diwata-2 Live Lab (Batch 1): PHL 50 Project
STAMINA4Space

3 Diwata-2 Live Lab (Batch 2): PHL 50
STAMINA4Space

4 Diwata-2 Live Lab : STeP-UP
STAMINA4Space

5 Diwata-2 Live Lab (Batch 1): PEDRO Center
STAMINA4Space

6 Diwata-2 Live Lab (Batch 2): PEDRO Center
STAMINA4Space

7 Diwata-2 Live Lab (Batch 1): GRASPED (Data Processing)
STAMINA4Space

8 Diwata-2 Live Lab (Batch 2): GRASPED (Data Processing)
STAMINA4Space

9 Diwata-2 Live Lab (Batch 1): GRASPED (Data Distribution)
STAMINA4Space

10 Diwata-2 Live Lab (Batch 2): GRASPED (Data Distribution)
STAMINA4Space

PUGAD

Philippine Universities Ground Archiving and Data Reception (PUGAD)

Pugad is the Filipino term for nest, where birds lay their eggs and eventually raise their offspring. Similarly, the Space Science and Technology Proliferation through University Partnerships (STEP-UP) Project strategically built PUGAD at three universities in Luzon (Holy Angel University), Visayas (University of San Carlos), and Mindanao (Mindanao State University-Iligan Institute of Technology) to further expand the knowledge base in space science and technology applications in their areas and eventually all over the country.

"Pugad" = nest

Meeting with Founding University Members of PUGAD

PUGAD is a network of Amateur Radio and Satellite Stations and serves as a training ground to establish terrestrial and satellite communications in the amateur radio bands. In parallel with its goals, it is equipped to send/receive signals to/from picosatellites, nanosatellites, and microsatellites with stable analog and digital communications and amateur satellites currently in orbit. In addition, PUGAD, with its base radio station, can double as an emergency node for communication, coordination, and response during emergencies and disasters.

Updates from STEP-UP scholars

"The fourteenth step..."

December 15, 2020

University of the Philippines- Diliman

Quezon City, Philippines

Prepared by STeP-UP scholars

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Contributing Writer

Marielle M. Gregorio
Contributing Writer

Lorilyn P. Daquioag
Contributing Writer

Maya-3 and 4 Critical Design Review

Bryan Custodio

The Batch 1 Scholars of the STeP-UP Project successfully presented the Critical Design Review (CDR) of the Maya-3 and 4 Cube Satellite development through a Zoom meeting on November 17, 2020. The virtual CDR presentation was attended by project stakeholders including members of the STAMINA4Space Program, UPD EEEI, DOST - ASTI, Philippine Navy, and UNISEC - Philippines representatives.

Maya-3 and 4 Critical Design Review

Bryan Custodio

The CDR highlights the scrutinization of the design of every subsystem of the Maya-3 and 4 Cube Satellites, from the space segment to the ground segment. It assesses the flight readiness of the Cube satellites and it also seeks out the approval from the project stakeholders to proceed to the next phase, which is the Flight Safety Review.

Maya-3 and 4 Critical Design Review

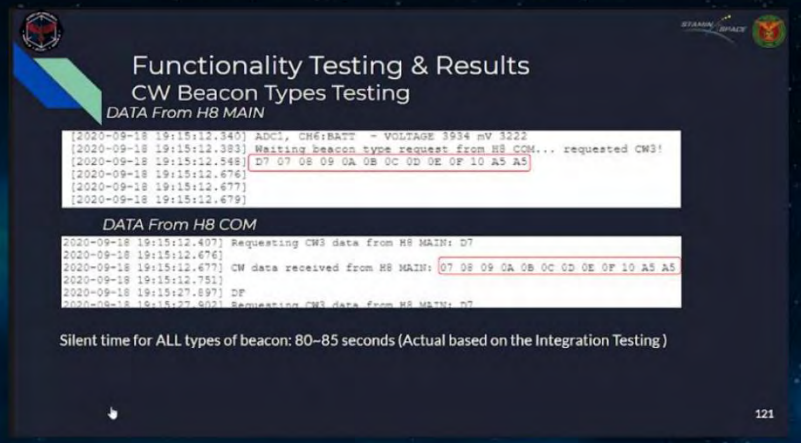
Bryan Custodio

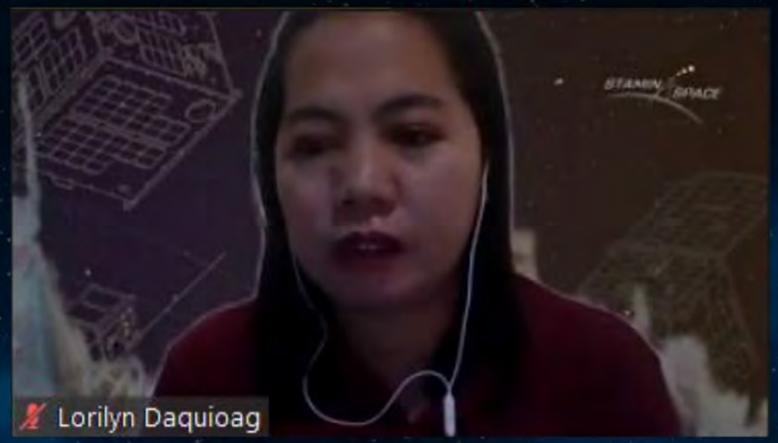
Judiel Reyes presenting the Mission Modes of the CAM Mission of Maya-3

Gladys Bajaro presenting the APRS-DP Mission of Maya-3 and 4

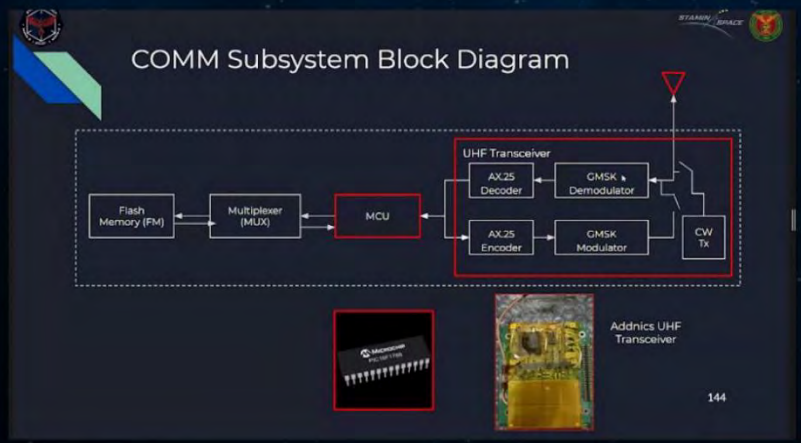
Maya-3 and 4 Critical Design Review

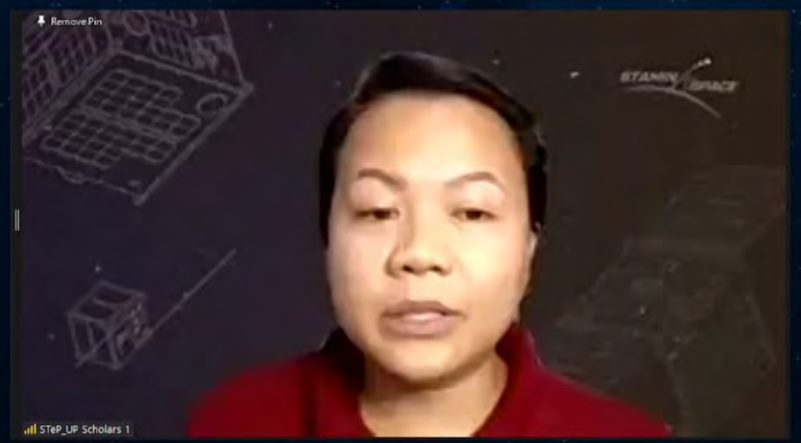
Bryan Custodio





Lorilyn Daquioag discussing the CW Beacon Types of Maya-3 and 4

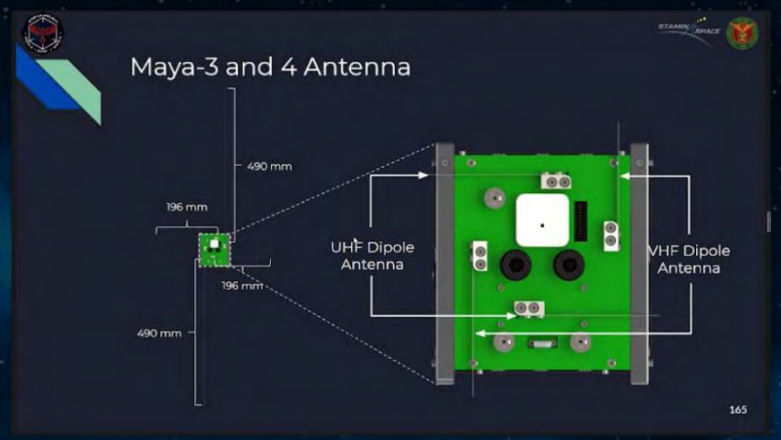




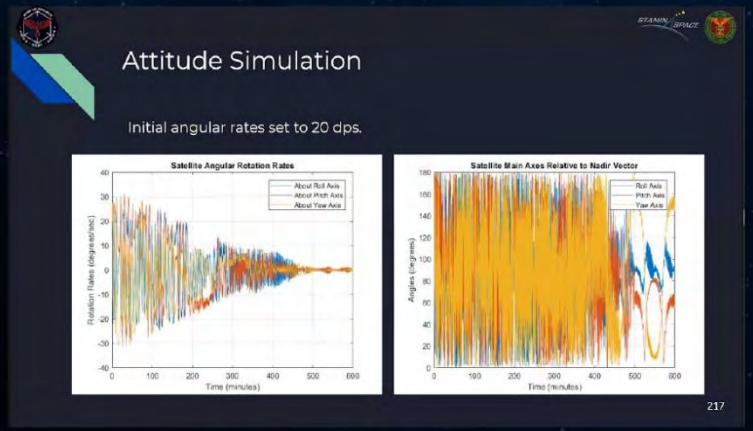
Christy Raterta discussing the UHF Communication Blocks of Maya-3 and 4

Maya-3 and 4 Critical Design Review

Bryan Custodio



Bryan Custodio presenting the Antenna design of Maya-3 and 4



Derick Canceran discussing the Attitude Simulation for the ADCS of Maya-3 and 4

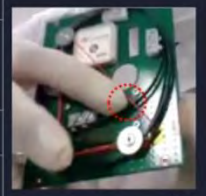
Maya-3 and 4 Critical Design Review

Bryan Custodio

Marielle Gregorio discussing the EPS Hardware design of Maya-3 and 4

List of Issues Encountered | EM

Issues	Action Taken	Remarks/Status
JAXA fit checker was not available during testing. Kyutech-made fit checker is not reliable.	Fit check was not performed.	Request JAXA fit checker for FM SET AT
Post-FT of VT was not done right after vibration test since UHF connector was not terminated. UHF RF cable was damaged during transit.	-	Make sure that all the cables are connected and the procedures of the test plan be followed.
It was discovered after VT that antenna was not stowed properly.	-	Proper antenna stowing procedure must be followed. The fishing line might affect the deployment of the antenna.
GPS patch antenna slightly rotated during VT trial 1.	Araldite was applied before trial 2 of VT.	Noted for the FM assembly.
Mechanical Switch check was not performed fully because there is no extra deployment switch to change the damaged deployment switches	Had a conference call with Harri of Birds-4 for the assembly dep switches for future use	-



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Renzo Wee discussing the Space Environment Test results of Maya-3 and 4 EM

The Land of the Rising Sun

Derick Canceran

This December, the STeP-UP scholars will perform space environment tests on the flight models of Maya-3 and Maya-4 at the Kyushu Institute of Technology (KyuTech) in Japan. They flew 3,000 kilometers from Manila to Tokyo and proceeded with their 14-day quarantine.

Arrival at the Narita Airport. On our way to the waiting area for the COVID-19 test results

The scholars on the plane bound to Narita Airport in Japan.

As part of the Japanese health protocols, they need to remain within the hotel premises and avoid public transportation during their quarantine. They also need to report their health condition to the health officers.

The Land of the Rising Sun

Derick Canceran

Negative! All eight scholars have tested negative for COVID-19 upon arrival at the airport.

The scholars can then travel to KyuTech once the 14-day quarantine period ends.

The team acknowledges the support of the DOST-Science Education Institute for this Research Enrichment activity.

Though unable to physically buy food outside the hotel (hotel food services are unavailable until next year), the team relies on online delivery services such as Demae-Can and Amazon Japan for food and other needs. So far, transactions have been smooth and easy.

Photo at the Christmas-themed lobby of the quarantine hotel.

UPDATES FROM
STEP-UP SCHOLARS BATCH 2

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

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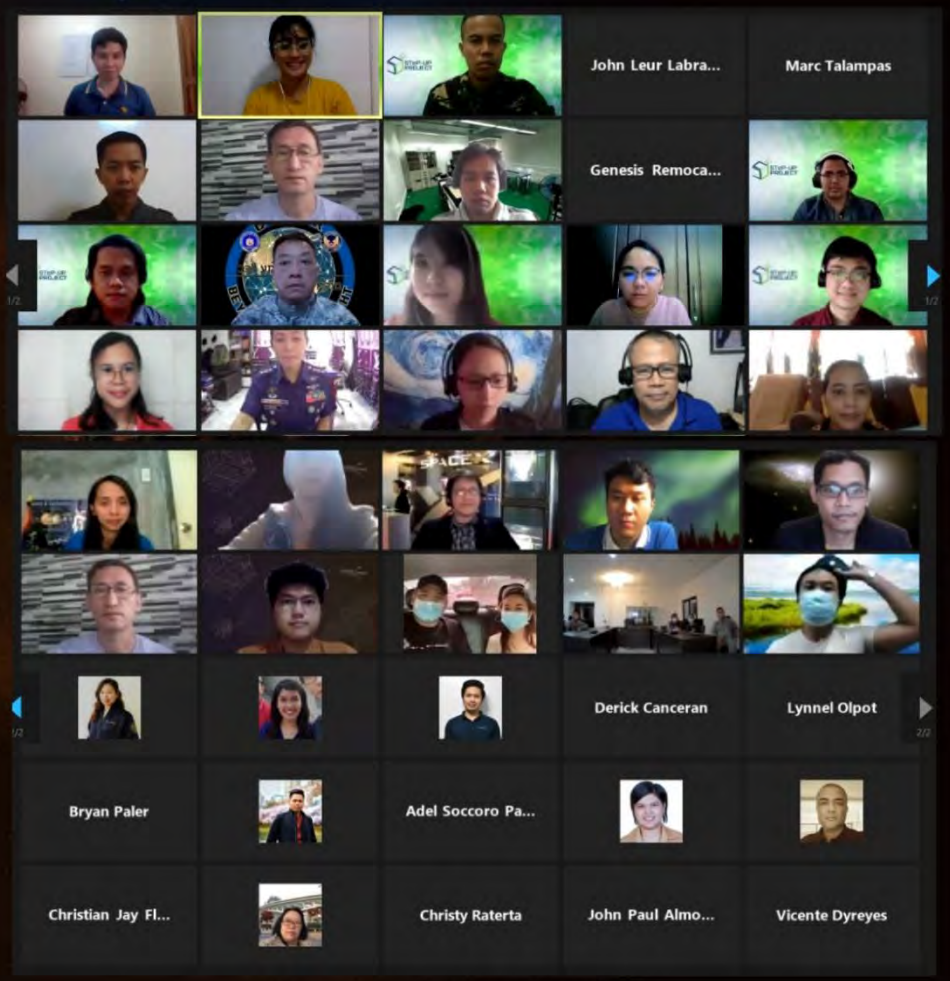
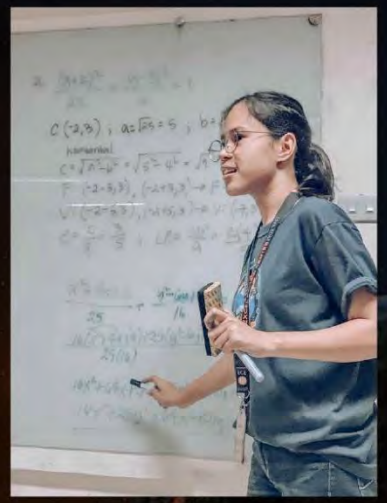


Attendees during the MDR

The STeP-UP scholars Batch 2 heed the advice of the stakeholders and experts in the field of nanosatellite engineering during their Mission Design Review (MDR) via Zoom last November 27, 2020.

Attendees of the event include PhilSA Director General Joel Joseph Marciano Jr., Stamina4Space Program members and program leader Dr. Gay Perez, the members of the BIRDS-4 team and BIRDS-2S team, representatives from DOST-SEI, DOST-ASTI, DOST-PCIEERD, UNISEC PH, and officers from the Philippine Air Force.

MISSION DESIGN REVIEW FOR MAYA-5 AND MAYA-6



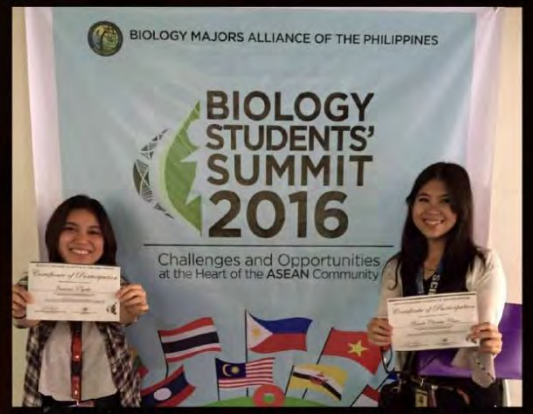
ANNA ALVAREZ

PHL

AC CHUA

Anna is an MSU-IIT graduate and a math mentor in the same university before she entered the scholarship under the STeP-UP project.

Her hobbies include gardening, astronomy, watching anime, and fangirling over the K-Pop boy group BTS.



AC graduated from UST where she took part in multiple conventions and competitions, including being a global finalist in the NASA COVID-19 Space Apps Challenge. She is passionate about graphic and web design, and likes to watch movies and go to museums during her free time.

STAMINA SPACE

STeP-UP PROJECT

MEMBER FEATURE

33. Arrival of Ariel Manabe of Paraguay on 17 Dec 2020

In this newsletter issue, see also these sections:

12. Send offs for Mr. Ariel Manabe – Kyutech's first JICA SDG scholarship recipient
13. More about the Japan-based Yguazu colony in Paraguay – continued from Page 2

Ariel is our first JICA-SDG fellow at Kyutech. He grew up in Paraguay. After two weeks of quarantine in JICA House in Tokyo, he finally made it to Kyushu – his home for the next two years. See arrival photos on the following pages.

Photos are by G. Maeda.

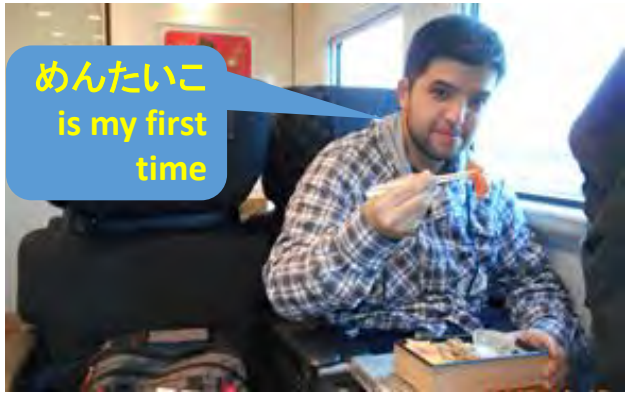
Above:
Arrival from Haneda at Fukuoka Airport.

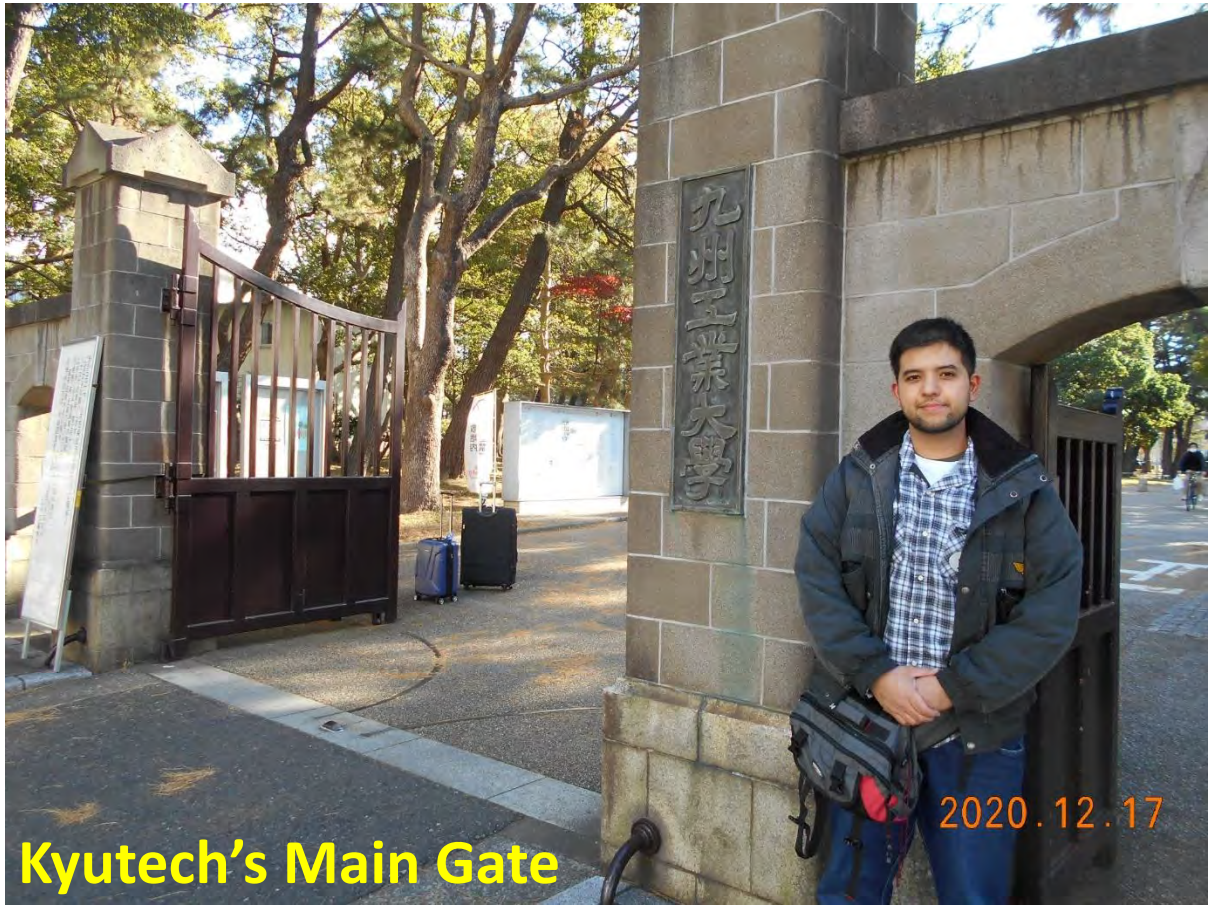
Left:
Riding the subway from the airport to Hakata Station.

博多駅

Hakata Station

Express Train from Hakata to Tobata at 13:19 on 17 Dec 2020





Kyutech's Main Gate

Ariel says,
"Finally"

COMMENT FROM PARAGUAY

Subject: Re: Arrival of Ariel Manabe in Kyushu, from Tokyo
From: Alejandro Roman
Date: 2020/12/17
To: George Maeda

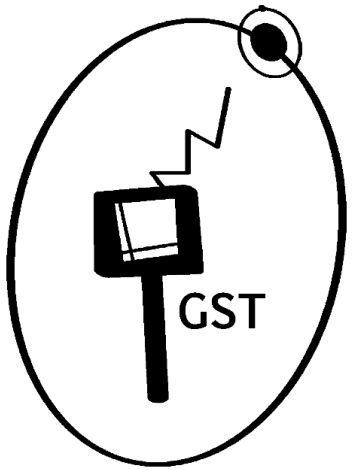
Dear Maeda-sensei,

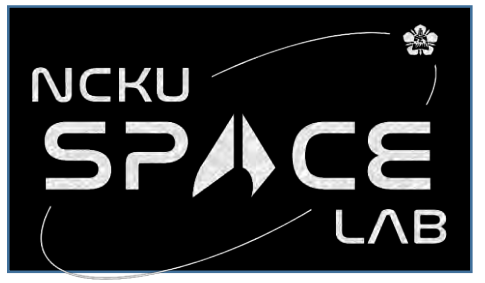
Thank you very much for your kind information, glad to read that Ariel has arrived safe and sound.

We will follow his progress, happy holidays for all of you too from Paraguay!

Sincerely, Alejandro J. ROMAN MOLINAS
Director General de Ejecución y Desarrollo Aeroespacial | AGENCIA ESPACIAL
(Director, AEP, space agency of Paraguay)

END OF THIS SECTION





GST Column, by Pooja Lepcha, Bhutan

Column Number Three

Updates from Taiwan

-- provided by Ke-Yen Hsu of NCKU, Taiwan

Component Selection for BBM:

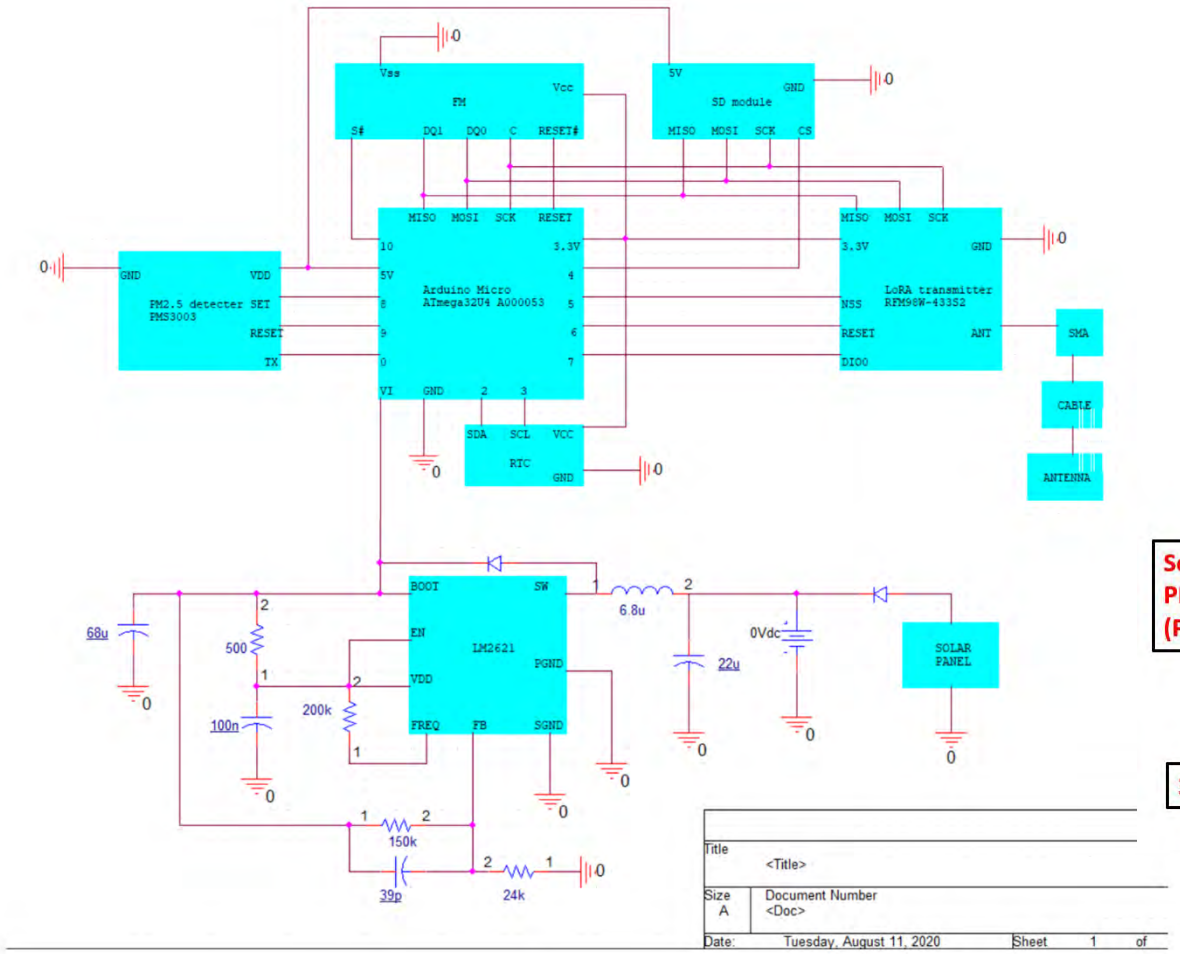
No	Components	Manufacturer	Part Number from Manufacturer	Price (NT)
1	MCU	Arduino	A000053	706
2	LoRa Module	RF Solutions	RFM98W-433S2	508
3	Real Time Clock	Adafruit Industries	3295	176
4	3.3V voltage regulator	Texas Instruments	LM2621MMX/NOPB	70
		Chip Quik Inc	PA0042	114
5	SD Card	Transcend	TS16GUSDU1E	265
		Digilent, Inc	410-380	454

No	Sensor	Objectives	Price (NT)
1	PMS3003	Obtain the number of suspended particles in the air, i.e. PM1.0, PM2.5 and PM10, and convert them in the form of digital interface.	194
		Total: NT 2487 ≈ $ 86.7	

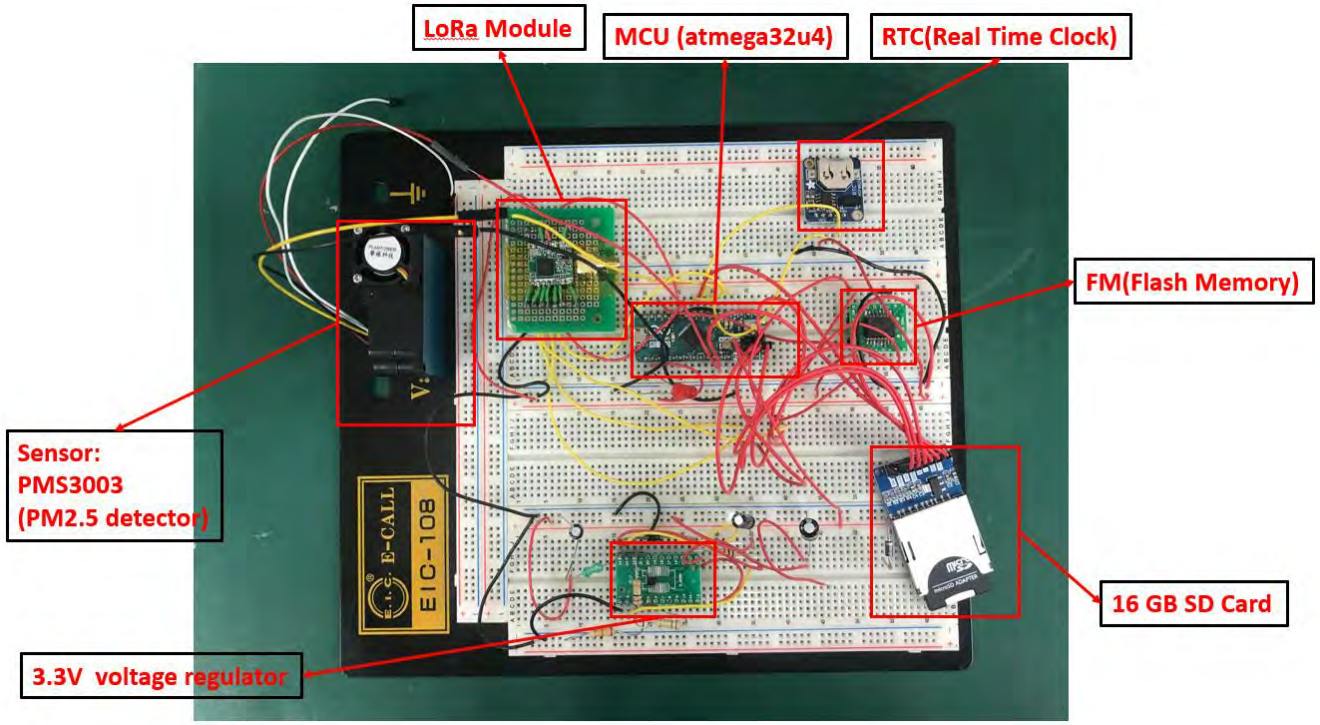
At this stage, we have replaced the FM with SD card to store the data. However, we also keep the design of FM to make it more flexible.

❖ We may add other sensors to obtain different types of data in the future.

Schematic of GST:



Breadboard Version:



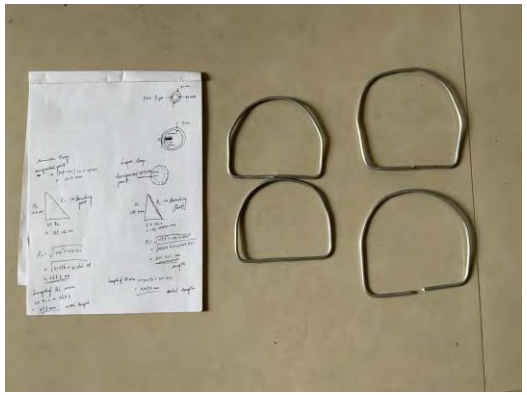
We made a schematic first and implemented it in a breadboard version. After finishing breadboard version, we will make the PCB version of GST.

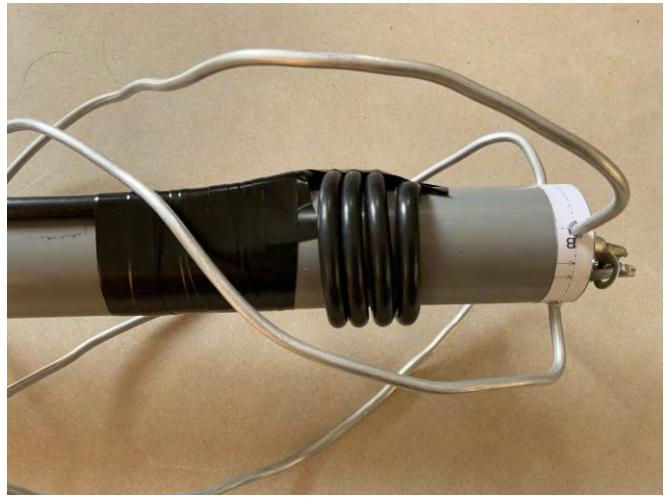
Component Selection for QFH antenna part:

No	Components	Price (NT)
1	Aluminum rods	70 / 1.7m
2	PVC pipe	117 / m
3	Coaxial cable	95
4	SMA connector	97
5	SMA connector plug	60

Total: NT 439≈ $ 15.3

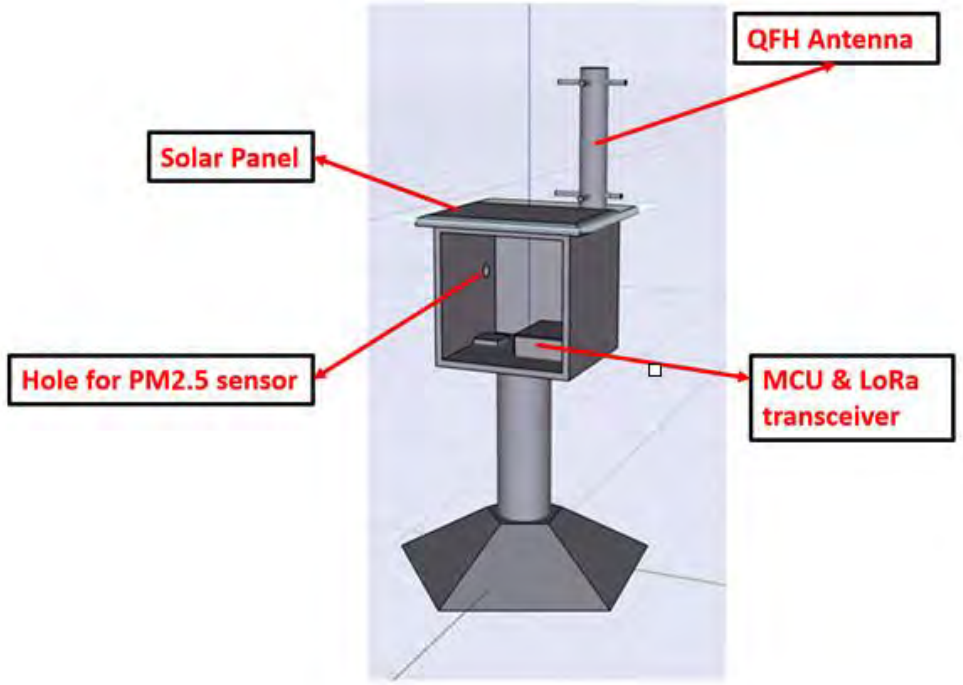
Regarding “QFH antenna part”, we used the components Pooja provided and took the reference from the site:
http://jcoppens.com/ant/qfh/calc.en.php
to make the first prototype.





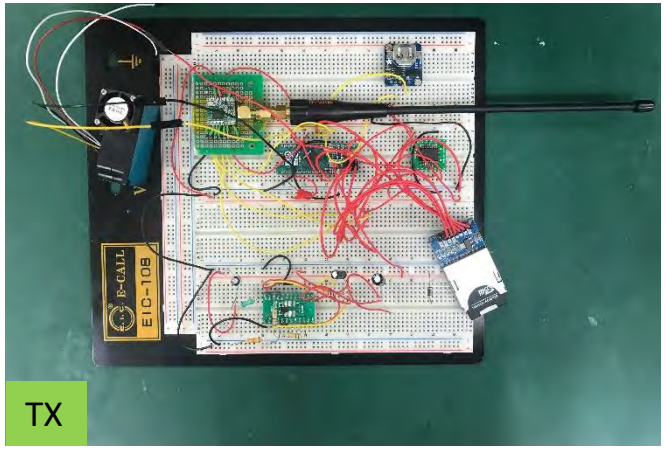
QFH Antenna:

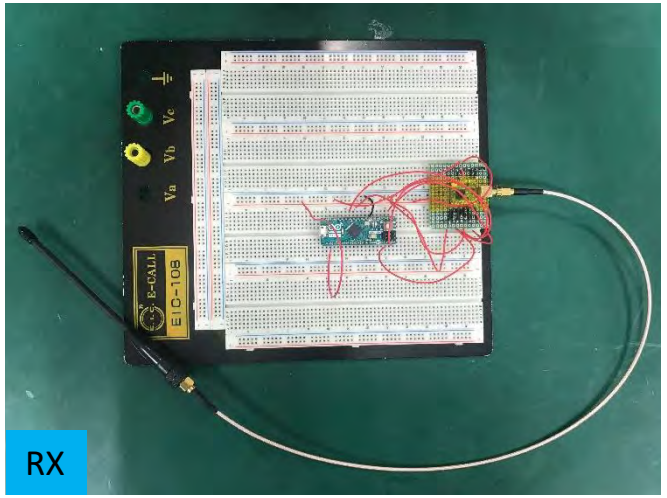
Design of whole GST:

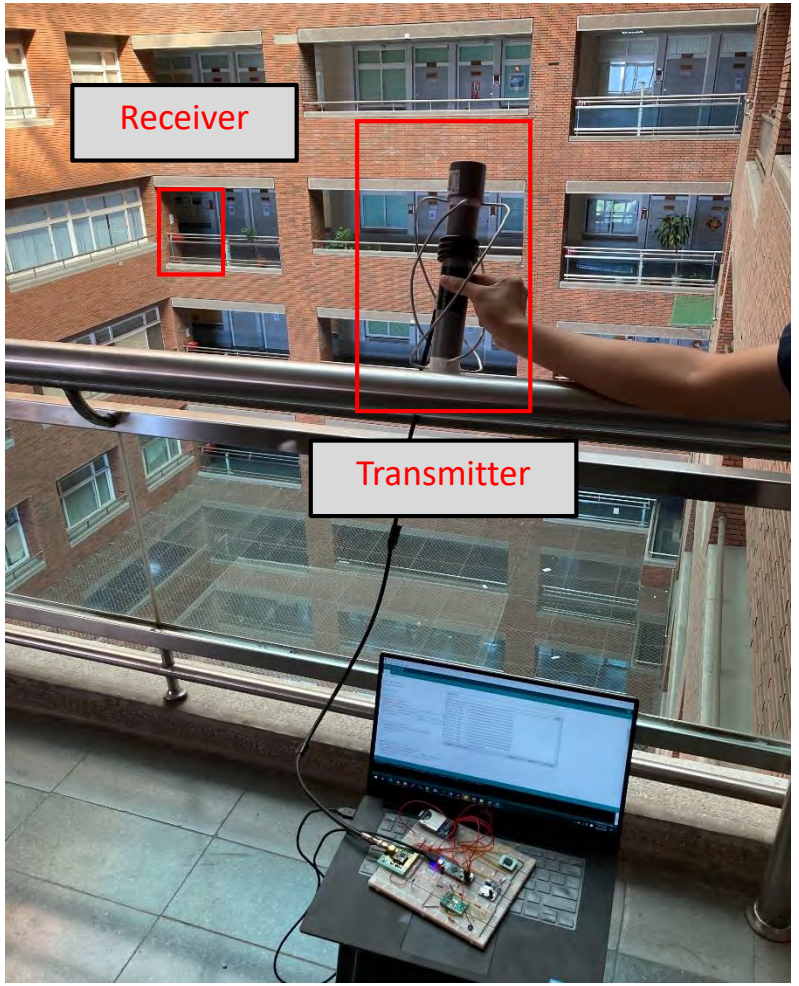


This is the first prototype of our QFH antenna, and we also made the design of the whole GST integrating each components.

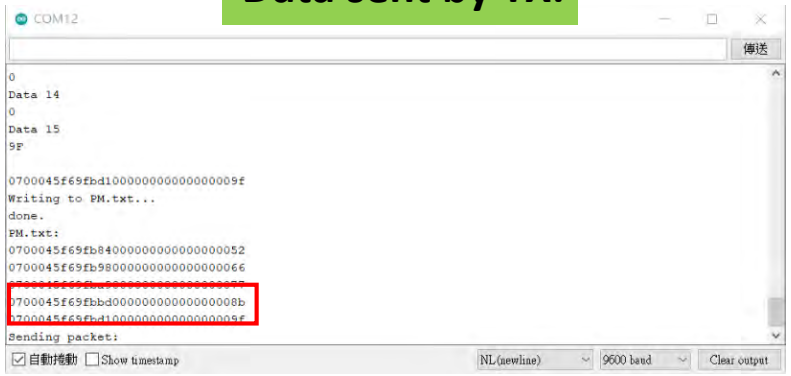
Communication Test Indoors :



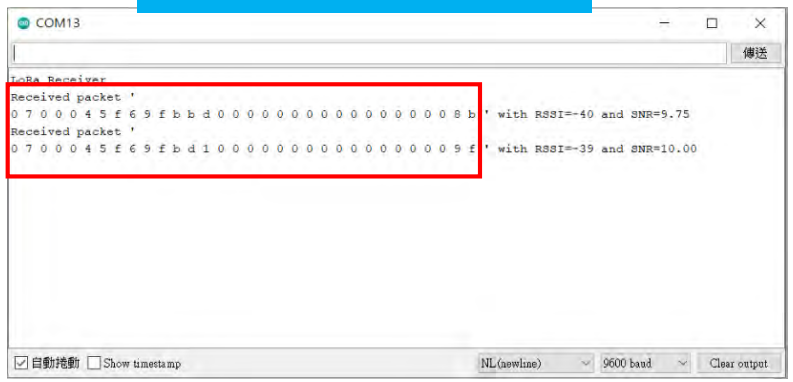




Data sent by TX:

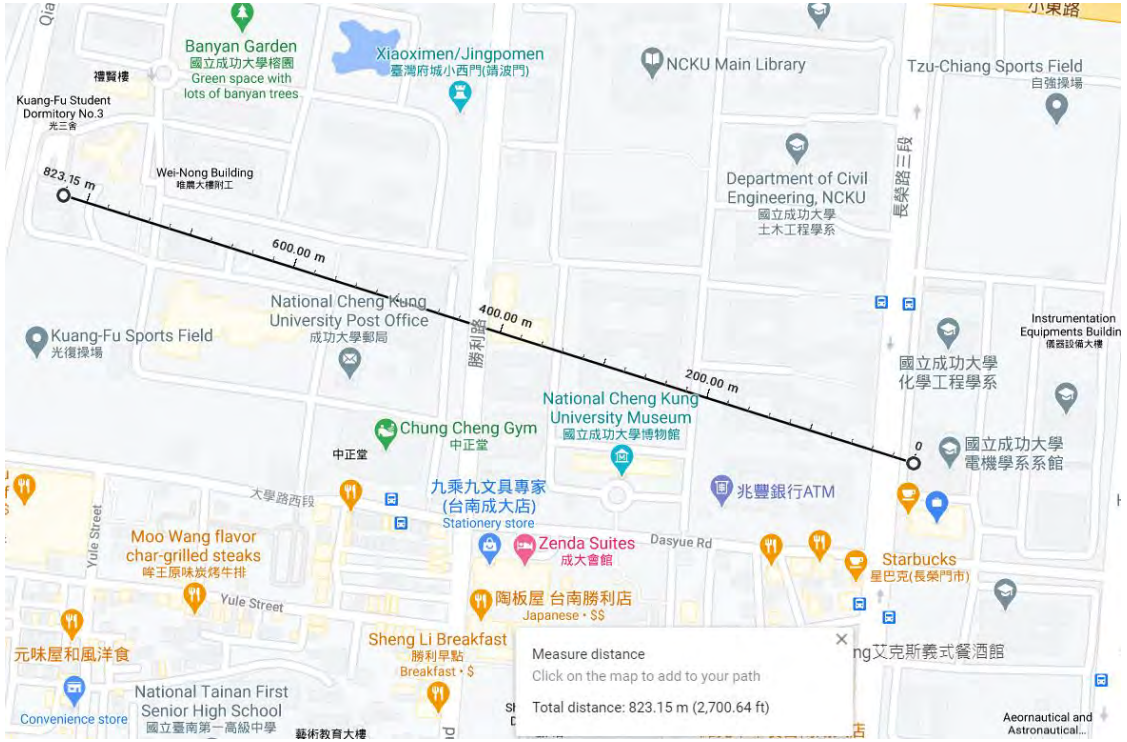


Data received by RX:



We combined the data collected by sensor with “GST ID”, “Data Type”, “Time” and “CheckSum” to make it be consistent with data packet format. Send these data packets through GST and use the same LoRa module and MCU to build receiver to verify whether the correct data is received or not. The test was successful since the outputs of TX and RX were the same. At the same time, we also integrated QFH antenna with the GST and test it in the NCKU EE department building.

Communication Test Outdoors :



Second, moving the GST with QFH antenna to the NCKU dorm roof. The distance between EE department building and dorm is 800m. The test was successful as well.

QFH Antenna Test:

We also tested the QFH antenna through spectrum analyzer to check it works or not. Following are some parameters:

- Mode : NA (S11)
- Marker : 433.375MHz
- Return loss: -7.853dB

The return loss was apparently not good enough. We will follow the guide Pooja provided to make the second QFH antenna and try to improve its performance.

Power Budget

Part	Power Consumption (W)	Number of components	Remark
MCU	0.06	1	
RTC	0.3	1	
LoRa module (Transmit mode)	0.396	1	3.3 V * 12 mA
SD Card	0.4	1	5 V * 8 mA
PMS3003	0.5	1	5 V * 10 mA
Total	1.656 W		
Reserved 10% for converter efficiency	0.1656 W		
Total average power consumption	**1.8216 W**		

This table is the calculation of power consumption for our GST. However, we haven't added "solar panel" part and "battery power" part to evaluate the power margin is enough or not.

We have tested the whole GST (equipped with four AA batteries) without charging. The work time is around 4.8 hours. In our future work, we will test the system with solar panels to see the charging ability and evaluate the whole power system.

End of this section

35. BIRDS-2: Updates from Azami

Azami (BIRDS-2, Malaysia) organized a ZOOM telecon for the BIRDS-2 Project members. In this article, he summarizes some of the discussion.

This meeting was needed to summarize the entire history of the BIRDS-2 satellites, which recently all de-orbited. On the next page you can see their basic history, from first beacon to last beacon.

Editor

BIRDS-2 ZOOM telecon and GS operation summary

- On November 28th, 2020 from 21:00 to 22:00
- Participants were Cho-sensei, Kim-sensei, Maeda-sensei, and BIRDS-2 members
- The BIRDS-2 CW records are as follow:

This article prepared by:

Muhammad Hasif Bin Azami

Dec. 10th, 2020

	BHUTAN-1	MAYA-1	UITMSAT-1
First beacon (received by GS)	Aug. 10th, 2018 10:23 (UTC)	Aug. 10th, 2018 10:17 (UTC)	Aug. 10th, 2018 10:23 (UTC)
Last beacon (received by GS)	Nov. 16th, 2020 10:40 (UTC)	Nov. 19th, 2020 01:14 (UTC)	Nov. 19th, 2020 01:25 (UTC)
Last TLE	Nov. 18th, 2020	Nov. 19th, 2020	Nov. 20th, 2020
Total no. of CWs	1256	1160	951
Total no. of uplink (from KIT GS)	5245	6104	3613
Satellite in orbit (days)	831	832	833

BIRDS-2 ZOOM telecon and GS operation summary

- In the BIRDS-2 CW beacon data, we can observe:
  - ✓ The Cubesats are alive! (most importantly)
  - ✓ The battery voltage, temperature, and heater enable flag (automatically ON when reaches < +8°C)
  - ✓ The internal boards temperature (On-board computer, Backplane, Communication, and Mission Board)
  - ✓ The antenna deployment status (all 3 BIRDS-2 Cubesats showed 'deployed' in the first CW beacon)
  - ✓ The reset time (BIRDS-2 will reset every 24 hours in space)
  - ✓ The first uplink cmd received status (the flag changed to 1 means received in July 2019)
- During the 2 years+ BIRDS-2 in orbit, we were also managed to study the behaviour of the satellites from the TLE collected too
- The following are examples of BIRDS-2 CW data summary:

Battery Voltage Reading of BIRDS-2 for 833 days			
	BHUTAN-1	MAYA-1	UITMSAT-1
Max	4.30V	4.30V	4.30V
Min	4.08V	4.00V	4.04V
Median	4.24V	4.22V	4.24V

Battery Temperature Reading of BIRDS-2 for 833 days			
	BHUTAN-1	MAYA-1	UITMSAT-1
Max	+34.1°C	+32.4°C	+34.4°C
Min	+0.8°C	+5.5°C	+5.9°C
Median	+7.8°C	+7.8°C	+8.6°C

BIRDS-2 ZOOM telecon and GS operation summary

We miss the gathering/meeting like the old times!

From Japan, Bhutan, Philippines, and Malaysia

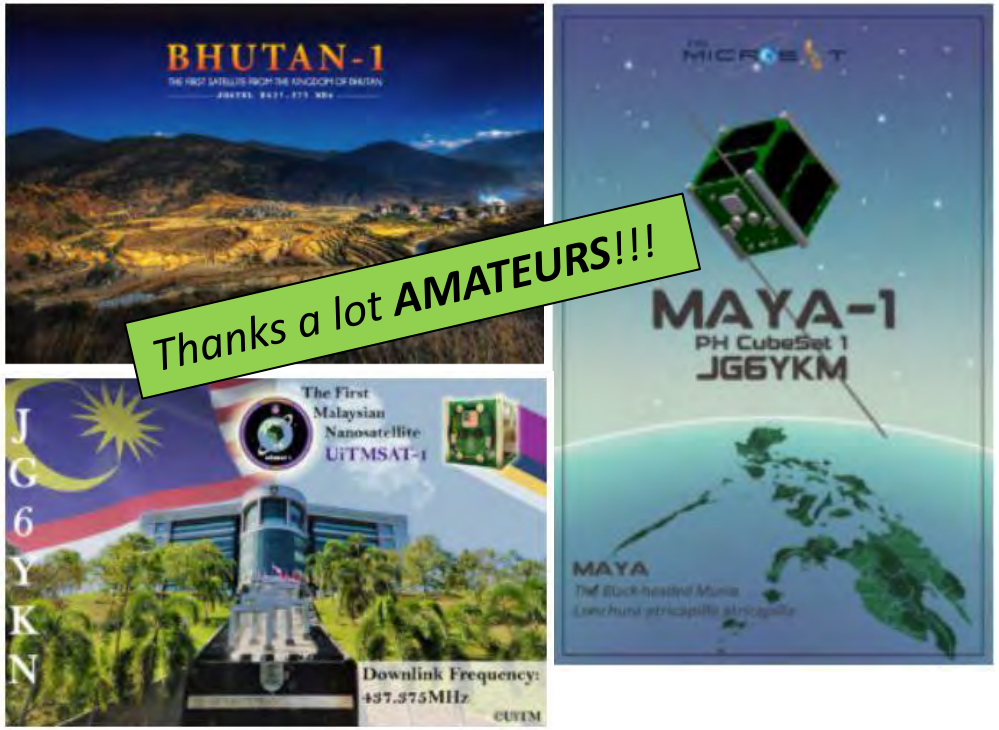
BIRDS-2 QSL card postage

BHUTAN-1 QSL Card
(Total: **44**)

- Australia -2
- Belarus – 1
- Denmark – 1
- France – 2
- Germany – 2
- Greece – 1
- Indonesia – 3
- Italy – 5
- Japan – 5
- Malaysia – 3
- Philippines – 1
- Poland – 1
- Romania – 1
- Russia – 2
- South Africa – 1
- Germany – 2
- Taiwan – 1
- Thailand – 3
- UK – 1
- USA – 6

UiTMSAT-1 QSL Card
(Total: **29**)

- Japan - 4
- Belarus - 1
- Russia - 2
- Malaysia - 2
- Denmark - 1
- Indonesia - 2
- Australia - 1
- Germany - 1
- Italy - 5
- USA - 4
- South Africa - 1
- Romania - 1
- Greece - 1
- UK - 1
- Philippines - 1
- Thailand - 1



The QSL cards have been sent to the amateurs as an appreciation, who successfully receive the CW beacon or APRS beacon signals.
It is also a part of outreach activities, where the amateurs can help to track the satellites together.

BIRDS-2 Memories Video

- Three-minute video created by Syazana
- You can watch it from Kyutech SEIC YouTube channel: https://youtu.be/oBbOfvWhvNU

Project kick-off @ Nov. 7th, 2016
BIRDS-2 launched @ June 29th, 2018
BIRDS-2 deployed @ Aug. 10th, 2018
BIRDS-2 de-orbit @ Nov. 20th, 2020
Total project duration:
48 months 13 days!

End of BIRDS-2 article by Azami

36. BIRDS-2S team taking a tour of our campus

Marloun
(BIRDS-4, Philippines, Phd candidate)

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

For the next few weeks, they will be here to test their BIRDS-2S satellites, Maya-3 and Maya-4, using the environmental test facilities of CeNT. Marloun is giving them a quick tour of the Tobata Campus.

See also Pages 150 and 151 of this newsletter for more photos of these visitors from the Philippines.

End of this **BIRDS Project Newsletter**

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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.