



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



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

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

All back issues are archived at this website.

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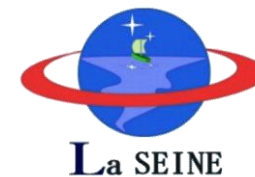
BIRDS Project Newsletter

Issue No. 75
(30 April 2022)



Edited by:
G. Maeda

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



All back issues of this newsletter can be easily downloaded.

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

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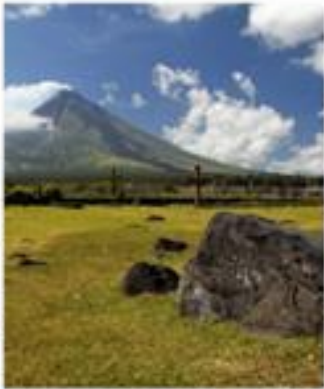
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From Philippines

The Guest Box



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In the province of Albay in the Bicol Region, you can find one of the most iconic landmarks in the Philippines, the *Mayon Volcano*. Towering 2,463 meters above sea level, this wonder of nature is known for its near-perfect conical shape. This highly active volcano had its most recent eruptive episodes between May and October 2019, where white gas-and-steam plumes rose to up to 800 meters as captured by the *Sentinel-2* thermal satellite. *Mayon Volcano* is also associated with Japan's *Mt. Fuji*, as the latter also has a near-perfect conical shape. For this, they are considered sister volcanoes of fire and ice.

-- from BIRDS-4 students: *Mark, Marloun, and Izzie*, of the Philippines;
12 April 2022

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



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.

This section consists of three sub-sections

- ① Advice to students from G. Maeda
- ② Messages from BIRDS Project Managers
 - a. BIRDS-1
 - b. BIRDS-2
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 - d. BIRDS-4
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- ③ Various messages from newsletter readers



Dear readers and especially to the students:

This is the last issue of the **BIRDS Project Newsletter**. It has been a wonderful experience for me. I hope it has been informative and entertaining for you. In *"The Alabaster Girl"* (a book by Zan Perrion), he states:

"All beautiful things must end.
Otherwise, they are not beautiful."

This newsletter was first issued on 18 January 2016. At that time, I knew that the "BIRDS-1 Project" would run for a total of 24 months -- having kicked off in October of 2015 with a meeting of all relevant staff and students (in the Cho Lab Seminar Room on the 4th floor). After that auspicious kick off, the CubeSat project became international capacity building drama in real time.

I thought that to document such an innovative academic endeavor in proper detail (technical details as well as the human-interest aspects), it would be too difficult to accomplish at the end of the 2-year project: There would simply be too much stuff to cover in one final and definitive document – it would never get done.

Hence, another way to tackle this problem is to perform documentation in “near real time” – in this case, once per month. This sort of effort is reasonable – it can be managed.

Of course, what I did not foresee is how many BIRDS projects would be initiated. In the end, the BIRDS Program consists of these five BIRDS Projects:

1. 2015--**BIRDS-1**: *Ghana, Bangladesh, Japan, Nigeria, Mongolia*
2. 2016--**BIRDS-2**: *Bhutan, Malaysia, Philippines*
3. 2017--**BIRDS-3**: *Nepal, Sri Lanka, Japan*
4. 2018--**BIRDS-4**: *Paraguay, Philippines, Japan*
5. 2019--**BIRDS-5**: *Japan, Uganda, Zimbabwe*

Italics indicate national maiden satellite.

Let me tell you: Although on the surface it appears that BIRDS projects became routine after the first one, they were far from routine. Each time, you have different:

- ◆ Students (designers, builders, testers, and operators)
- ◆ Stakeholders (they put up all of the funding)
- ◆ Circumstances (e.g., global pandemic, semiconductor shortages)
- ◆ Moving targets (e.g., JAXA safety requirements)
- ◆ Availability of components (some things go out of production)

Accordingly, the newsletter did not become routine. In particular, each project brings in new students (Japanese and foreign). New students change the dynamics of everything.

In the beginning, I focused on the interests of the stakeholders (they are mentioned in the previous paragraph). As they were the providers of the funds, I felt that project management (Prof Cho, myself, and other faculty members) had some obligation to inform them on how their projects were proceeding. Stakeholders provided the money – they had some right to know how their money was getting spent. Also, they had an obvious interest in knowing how their students were performing and learning. This was the primary motivation for this newsletter: *To keep the stakeholder informed*. For example, each project has milestones: Project kick off, MDR, PDR, CDR, handover ceremony, launch, deployment, first signal, etc. These should be reported to the stakeholders in the same way that any public company ought to keep their shareholders informed. Transparency is always desirable for peace and harmony among key players of any human endeavor.

However, as the years rolled by, it became the secondary motivation for me as editor of this newsletter.

Over time, I decided that this newsletter serves as an example to all of our students – inside and outside of the BIRDS teams. I sent the newsletter to all SEIC students. And here is my message to them:

There are many ways to disseminate information in an academic environment. You have traditional classroom lectures where professors stand in front of students. You have major academic conferences where staff and students both attend to exchange notes. You have academic journals where peer reviewed papers are published. This list goes on and on. To this list you can add:

Newsletters.

I think you have seen how I constructed this newsletter each month since the year 2016. I write some of the material, but most of the material was contributed by students. Hence, I soon realized that this newsletter was a platform for students to say things – probably too minor for an academic paper and yet still worthy of distribution to his or her campus peers. With this email platform (newsletter), the student receives a chance for “self expression”, or documentation.

To document something, you must:

- i. Experience a few things (e.g., collect data)
- ii. Think clearly
- iii. Organize your information
- iv. Figure out a way to convey it to a third party in an “easy to understand” manner – it must be lucid and compelling

To be a useful member of society, you need this kind of practice and training. And the more you do it, the better you become at it. Practice makes perfect.

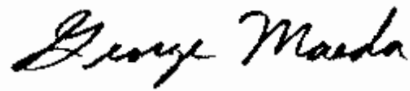
So here is the conclusion of this editorial. The staff of Kyutech earnestly hopes that you will aspire to **Big Goals**. Set your sights high – so aim high. Anyone can aim low; you do not want to be anyone. If you join a company, aspire to be in the ranks of upper management (including the company president). If you join the government, aspire to be near the top (such as the head of an agency). If you join a university, aspire to be a professor someday. ***Be ambitious with your life (as you only get one).***

And then recall that there are many ways to propagate information, including the establishment of a newsletter for your peers. You can be the editor. ***My newsletter is an example of how it can get done; you should create your own style as editor.***

But as long as you have people under you, you have responsibilities towards them. You want them to grow as a company employee, as a government worker, or as an academic researcher. Their personal growth is part of your job as a leader (if not, then you are not a real leader). So you must create the platforms that allow them to grow.

Documentation is one of them.

Sincerely,



G. Maeda
29 April 2022



The first issue of this newsletter

**On the following
pages are
messages from
each BIRDS
Project Manager**

I feel so blessed whenever I looked back at my days at the Kyushu Institute of Technology (Kyutech) between October 2013 ~ September 2018. The five years I spent there remains one of my best experiences and where I gained my most important life lessons. I am grateful for all the brilliant student and faculty I met there. The lessons I learnt there will remain with me for life and continue to shape my career path.

Being a member of the first cohort of the BIRDS satellite and particularly as the pioneer project Manager was one of the best experiences in my life. The project kicked off in October 2015 without any template for both systems development and the complex management of the project and human resources (project members). I learnt how trust, cooperation and independent dialogue could be used as tools for making real impact in the global space industry. The 16 students that worked on the project are still friends and we continue to support one another when called upon.

Prof. George Maeda, many thanks for all your hard work and knowledge sharing activities that you have shared with ALL BIRDS project students at Kyutech. Over the past years, you have made the SEIC program an indomitable voice in the global space community through active engagements and motivation. This is a fact!

As you step-down and take full retirement, I am sure the SEIC community will miss you and I hope you will keep engaging and supporting with your valuable advice and links. I pray that sunshine continue to shine upon your path.

I will choose Kyutech again!



Taiwo TEJUMOLA, Ph.D (M.Eng, PhD – Kyushu Institute of Technology)

BIRDS-1 Project Manager

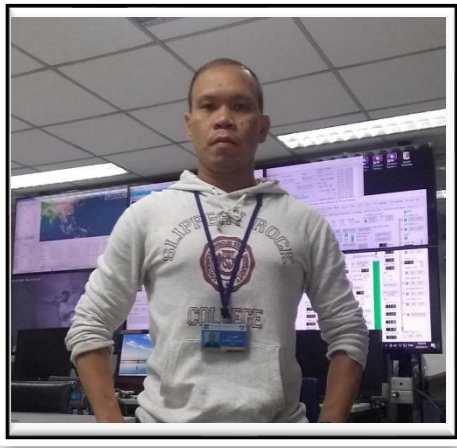
Assistant Professor of Space Systems Engineering.

International Space University

1 rue Jean Dominique Cassini, 67400 Illkirch-Graffenstaden, France

Email: taiwo.tejumola@isunet.edu

Web: <http://www.isunet.edu>



“Diversity over one common purpose that we, as an integral part of Birds Project, from being a Non-Space Faring to achieve the progress of being now a Space Faring nation. We can contribute Missions, Application, and creative/innovative ideas to the peaceful use of outer space”.

Proliferation is the key stamina on how far we can sustain all things we started for our country to become a space faring nation. Wherein as a graduate of SEIC we have the responsibility to educate younger and next generations of engineers and scientist in a more clever and not boring way, to be generously share all our gained knowledge, skills, and experiences to transfer the technology we’ve learned to carry on better ideas and improve/innovate our design, process, and procedures when it comes to building our next generation future satellites.

Designing CubeSat’s during our time is serves as our medium to build and develop our confidence to practice and learn to be a better space engineer. But we should remember that it is not all about that piece of hardware we sent to space. It’s the Diversity that we experience and friendship that we gain despite our differences in culture, faith, and language. That we should continue to help each other as a neighbor country, as a human being to share our knowledge and promise that we will only develop technology in the peaceful matter of using our outer space.

“Proliferation is the key stamina on how far we can sustain all things we started for...”



Joven C. Javier, M.Eng.
BIRDS 2 Project Manager - PHILIPPINES
SEIC Masters Graduate, 2016-2018
Kyushu Institute of Technology, Fukuoka Japan

Dear Prof. Maeda and *BIRDS Project Newsletter* Readers,

First of all, we must come together to thank Prof. Maeda for all his effort and hard work in supporting the project from the very beginning and for being one of the key personalities for launching space programs/satellite development in all the previously non-space fairing countries. For Nepal alone, Prof. Maeda played an extremely key role in facilitating/negotiating direct talks with the government, providing necessary documents and a lot of behind-the-scenes support to make it happen.

Thank you Prof. Maeda for being there for us all the time.

Furthermore, I am extremely fortunate to have been part of the BIRDS project as much of the work that I am doing today is being directly affected by what happened in those few years at Kyutech. The *BIRDS Project Newsletter* had an important role to play, with month-wise documentation of all the activities from BIRDS-1 through BIRDS-5. I do go over a few of those newsletters to get information that I thought was lost or need some reference docs for our ongoing projects. Suffice to say, *BIRDS Project Newsletter* has taught us that documentation plays an equally -- if not more -- important role in satellite research, development, and progress. I would like to again congratulate Prof. Maeda for his consistent effort in publishing the newsletter, and without fail, every month.

Regards,
Abhas
Project Manager of BIRDS-3



It was a great honor and blessing being part of the BIRDS project. Being assigned as project manager for the majority of BIRDS-4 gave me the chance to connect to people in a deeper sense and learn how to bridge the gap between stakeholders and team members. The BIRDS program, being a multi-national project that crosses country boundaries is an even greater reason to be thankful on being part as it allowed members to learn about the cultures and take a glimpse on how other people live and work in other countries. With space as an expansive and limitless field, I believe we can and we should continue moving forward by cooperation and doing collaborative projects that allows humans to overcome the great challenge imposed by space.

The thing that I always tell our team when we were building the satellite is that what we are doing is something that is bigger than us. It is the first few steps of our country into the great unknown of space and it will be the basis of future generations of our respective country moving towards investing in this area. The money invested in space is never a small amount and we should make sure all the tax payers, from whom the funds to join the project came from, would somehow benefit in what we are doing. As BIRDS members go back to their country, I hope we will always remember to give back to our countrymen who allowed us to attain this knowledge by looking for ways on how we can allow them to benefit from space. It may be direct like a product or service, or indirect like education, but at the end of the day, we should always remember our reason why we spent countless hours and sleepless nights just to finish building our satellite. Let us leverage on this great network we have built through the BIRDS program and accomplish greater things. Ad Astra!



Izrael Zenar C. Bautista
BIRDS-4 Project Manager
Executive Assistant – Philippine Space Agency

“A life is like a garden, perfect moments can be had, but not preserved, except in memory”. I feel honored to contribute my words to the last of the BIRDS newsletter. It is a sensational duration for me to write this article in the memory of the experience I have encountered over the years I have worked as a project manager for a bird 5 project.

In April 2020 upon my arrival at Kyushu Institute of technology, Professor Cho greatly privileged me to join the KITSUNE Project as an amateur to do the structural designing of a 6U CubeSat. In the KITSUNE project, I worked with highly professional engineers and was capacitated to CubeSats' development process (it was indeed an opportunity I could not turn down). It was a challenging path in my career however I never knew that the path was necessary to prepare me for a greater task which was to become the Project Manager for BIRDS 5.

The BIRDS 5 Project commenced on 14 July 2020 in which Japan, Uganda, and Zimbabwe were the participating nations. Furthermore, BIRDS 5 seeks to build the first satellite for Uganda and Zimbabwe. In September 2020 I was once again privileged to become the BIRDS 5 Project Manager to lead highly esteemed engineers from

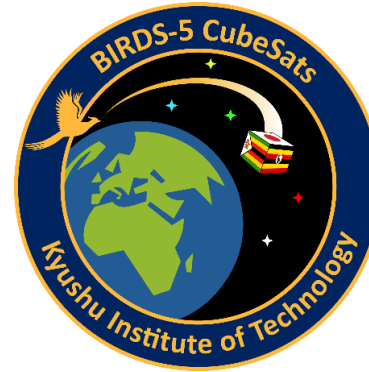
- Japan
- Morocco
- Trinidad and Tobago
- Sudan
- Uganda
- Zimbabwe

Managing BIRDS 5 was on its own a more challenging path for my career because of its dynamics in challenges that could be technical or social. Having people from six different countries with different cultures makes it more complicated in managing however, I enjoyed every bit of it. **Cont'd next page**

Besides gaining technical expertise over the years, I have learned a lot in project management such as maintenance of aim and purpose, task delegation, proactiveness, problem-solving, and strategic planning among others. Though I initially turn down the offer to manage the project, it is only now I realize that it was a worthwhile experience that has also created in me a lot of patience and virtue. my gratitude goes to Professor Cho and Professor Maeda who have been so supportive in this matter.

Kyutech creates a warm entry into the space fraternity and participates in satellites building a broader anyone's network because of the multi-national environment which is rare to get anywhere in the world. *To all the students currently in space engineering and to those that have graduated I would like to wish you a successful future in the fast-growing space industry. Being a graduate of Kyutech, we have been imported with the necessary skills to join any Space industry and I'm sure with the capacity we have gained we will surely deliver.*

Real education starts after graduation, and it never ends therefore stand firm in all challenges, successes, and failures you experience. If you are to fail do not despair, learn from it. For now I say “aluta continua” (The struggle continues) and bon voyage to all the readers of this article.



By Victor Mukungunugwa
BIRDS 5 Project Manager
Senior Scientist at
*Zimbabwe National Geospatial
and Space Agency (ZINGSA)*





**On the following
pages:**

Messages from
newsletter readers

It was one of the first days at office since our space agency creation. We, the newly appointed directors, were sitting on a conference table donated by the Polytechnic Faculty when we all have our yearlong planning gathering. In this meeting, we all were asked by the president of our agency, Mr. Vielman, what can we do to start building our first satellite. I still remember how we all were looking through internet any satellite launching opportunity. That was when Adolfo Jara found a KiboCube program at the UNOOSA web site. This was a hot summer day in late February and the call for interests was due few weeks from then. We thought we lost that opportunity.

Then, later the same year, a graduate student from Paraguay attending a master program in satellite instruments at an Argentinian higher education institution, Blas Vega, passed a business card from a contact in AEP to Prof. Maeda who was then, attending the same conference. Mr. Vega happened to have Mr. Roman's card in his pocket. This resulted in our first meeting with Kyutech towards joining BIRDS 4 program as a participant, and the sending of human resources for training to Kyutech for capacity building. Many more meetings and correspondence between Kyutech and AEP followed this event.



A team of AEP engineers and engineering students are working on a program called CAPacity Building, REsearch and Innovation - 4 Space (CABURE'I-4S) as a next step, says Jorge Kurita, AEP director of planning and management. "Cabure'I" means "owl" in the indigenous Guarani language.

[Paraguay's First Satellite Deployed From the ISS | NASA](#)

Then, the signing of a Letter of Intention between Kyutech, UNA and AEP were carried out in Vienna. This marked the starting point towards the solid decision to build our first satellite with Japan.

Fast forward, we have not only successfully built and placed in orbit our first satellite but also, we are sending the fifth trainee from Paraguay to Kyutech. The Paraguayan space technology was born from the womb of Japan and now, this baby is being grown in Paraguay. The relationship between Paraguay and Japan will be stronger day by day, year by year. The second satellite will be made in Paraguay, and, with this, the loop will be closed since, this will be the validation of a real capacity building process. Thank you for all your support and, we will be in touch, as part of a global network of Kyutech alumni.

Jorge Kurita, Ph.D.
Director, Planning and Management
Space Agency of Paraguay
www.aep.gov.py
Cel.: +(595) 981-654994

From: "Joven C. Javier"
Date: 2022/03/31
To: G.Maeda

Dear Maeda-sensei,

Happy retirement and you did a lot of good things to us BIRDS Project members and as a SEIC students during our days in Kyutech. I personally appreciate it so much.

Thank you and have a happy healthy life after Kyutech.

Joven

From: O A Dahunsi <oadahunsi*futa.edu.ng>
Date: 2022/03/30
To: Joji Maeda

Dear Prof Maeda,

Thank you so much for introducing me to Mr Fuse, we shall be very delighted to work him as always.

We at FUTA, feel sad to let you go, we shall definitely miss you. The memories of your visits to us remain fresh in our minds and I can also recall all our meetings and candid discussions. Thanks so much for all you did and we wish you all the best in your future engagements.

Thanks,
Olurotimi Akintunde Dahunsi (PhD)
Mechanical Engineering Department,
Federal University of Technology, FUTA,
P. M. B. 704, Akure, Ondo State
Nigeria.

Subject: BPN special message
From: Muhammad Hasif Bin AZAMI
Date: 2022/04/09
To: George Maeda

Dear Maeda-sensei,

BPN has been a great platform to update the space knowledge about the BIRDS project and the newest information around the world!

The editor, the BIRDS members, and the collaborators, have created an excellent environment for the youngsters to learn more about space and satellite system engineering. Thanks a lot, Maeda-sensei!

Best regards,
Azami

Subject: Re: BIRDS Project Newsletter - Issue No.74
From: Paolo Marzioli <paolo.marzioli*uniroma1.it>
Date: 2022/04/08 18:04
To: Joji Maeda <maeda.joji749*mail.kyutech.jp>

Dear Prof. Maeda,

Congratulations for the achievements of your career on your retirement! It was a huge pleasure for me to have met you and to work with you, thanks for all you have done for me in the past years. And cheers to the exciting years ahead, hopefully visiting Rome soon. Hopefully with a new generation of Kyutech exchange students coming to Italy to study. Thank you so much!

Feel free to publish it in the Newsletter, really thank you for what you have done for me. Hopefully seeing each other in some parts of the world... very soon I hope!

All the best, Paolo



*By Fatimah Zaharah Ali
(UiTM, Malaysia)*

A VALEDICTION FROM MALAYSIAN EDITOR

A farewell message dedicated to BIRDS Project Newsletter (BPN) that shall have its final issue this month and also to the backbone of the newsletter, George Maeda-sensei.

I have written 28 columns + 2 guest boxes since I started as the Malaysian Editor for BPN back in January 2020. BPN Chief Editor, George Maeda-sensei had invited me onboard when I embarked on my PhD journey of satellite field in 2019. We had met few times at Kyutech before the times of pandemic. It is a sad affair that Maeda-sensei will retire this month, and with the retirement, the BPN will also end its issue.

BPN has become the electronic platform for sharing and gaining information regarding the space field. This free accessible material platform has become the bridge to link the space enthusiasts around the world together as one family. BPN has also been one of the sources for my PhD study reference and it helps me to understand more about the space world. Besides the space field information, other interesting contents were also included, and it was so really fascinating to read them.

I would like to congratulate to Maeda-sensei and all other BPN editors/contributors on the great works for 75 months. I also would like to wish Meade-sensei best wishes and great new chapter after the retirement. Thank you so much to Maeda-sensei and to all in BPN for giving me such irreplaceable opportunity and experience to become part of the space family. I hope that the space family stay strongly united as one always. ❤️



A SAYONARA MESSAGE FROM UiTM MALAYSIA



*By Prof. Dr. Mohamad Huzaimy Jusoh
(UiTM, Malaysia)*

BIRDS Project Newsletter (BPN) has been providing a very good platform for BIRDS team members, students, and all other people from various background and different cultures, to share the activities related to space field. Additionally, BPN has also been providing columns regarding the non-technical information that make the BPN more unique and interesting. Through BPN, space enthusiasts around the world and BIRDS members are united and become a big BIRDS family.

The credit shall go to the Chief Editor of BPN, George Maeda, and the team for the great efforts to ensure the continuous publication of BPN monthly with contributions and support from other editors around the world.

*Terima kasih daun keladi,
semoga kita berjumpa lagi!*
(Thank you and hope to see you again!)

Re: BIRDS Project Newsletter - Issue No.74
From: Alejandro Román <aroman@aep.gov.py>
Date: 2022/04/12 1:19
To: Joji Maeda <maeda.joji749@mail.kyutech.jp>

Dear Maeda-sensei,
Cc: Cho-sensei,

Congratulations on the 75th Edition of the **BIRDS Project Newsletter**, It was quite a journey those years. The Newsletter is an instrumental channel of collaboration, communication and cooperation between the BIRDS Family; now, the challenge to continue the path is open.

I am sure we will find a way to proceed with your guidance; being part of the BIRDS Project was the beginning of the space era for Paraguay. The launch of the first satellite was a national historical event with a TV Program followed by *2.9 million people in a seven million country*; it is a significant impact and inspired the new generations.

As I mentioned before the Newsletter was always a fantastic vehicle for communication and learning from Kyutech. And your help and support were fundamental Maeda-sensei, I hope you all the best, and I am looking forward to continuing in contact, I want to close this message with one word in three languages,

- Thank you very much
- どうもありがとうございます
- Agüijé. (Thank you in Guaraní)

Yours sincerely,
Alejandro R

Alejandro J. ROMÁN MOLINAS
Prof. Mg. | IAA Academician (M4)
Director General de Ejecución y Desarrollo Aeroespacial
AGENCIA ESPACIAL DEL PARAGUAY

Subject: BIRDS Newsletter Message
From: ALMONTE John Paul Breta
Date: 2022/04/13 13:20
To: George Maeda

Good Afternoon Maeda-sensei,

Here's my message for the BIRDS
Newsletter:

"The BIRDS Newsletter has been a valuable source of information of both space and non-space related activities that definitely piques the interest of its readers. Furthermore, it is wonderful to see through the newsletter how the participating countries has progressed in the field of satellite and space systems engineering over the years."

Best regards,
JP

Subject: Final issue of BPN
From: Apiwat Jirawattanaphol
Date: 2022/04/16 23:44
To: Joji Maeda

Dear Maeda-sensei,

Message for the newsletter:

Thank you to the BIRDS newsletter to share/update the information about the BIRDS satellite project to the BIRDS family worldwide.

Message to you:

Thank you very much for all your advice. All the time that I am your student. (I think about seven years). You gave me to learned a lot of experience. We went together to Taiwan, Ghana, Mongolia, Thailand, Laos, and Bangladesh. Thank you for the baguette you gave me.

If you have any chance to visit Thailand, please tell me.
Again thank you very much.

Best regards,
Apiwat Jirawattanaphol

Dear Maeda Sensei,

I started reading BIRDS Newsletter before I arrived in Japan. Each newsletter included everything I would have wanted to know, from projects to scholarships, to opportunities, and to latest news that too with beautiful pictures. The newsletter made me look forward to coming to Kyutech and being part of all of those activities. I wouldn't have known the value of documentation if not for the times I had to back track the newsletter archives for special dates and information I had forgotten.

After spending almost 5 years in Kyutech, I can look back at the life I lived through the newsletter and I am grateful to Maeda sensei, the editor of the newsletter for pushing me and others to write the articles.

Best regards,
Pooja, 17 April 2022

Dear Maeda Sensei,

Wow! You have had an amazing career journey!
Congratulations!

<BIRDS Newsletter Entry>

"My initial contact with Maeda Sensei was while I was a Research Engineer at the Nigerian Space Agency. At that time, I was making preparations to come to Japan for my PhD research. Maeda Sensei in his usual style, provided detailed nuggets on how to survive and have a good time in Japan. I have benefited from his wealth of experience on many issues. He criticised my entry materials *for IAF Emerging Space Leaders* program and it turned out to be in my favour. He is a sharp, focused and knowledgeable individual. I will always remember his special sandwiches he prepared for us in those memorable laboratory dinners. How can I forget Maeda Sensei's old fashion, funny but lovely telegrams/letters? In many ways you have impacted us positively. I wish you a happy retirement and blissful enjoyment for the rest of your life."

Best Regards
Femi, 27 April 2022 [now at NICT]

Subject: RE: last issue of birds newsletter
From: 栗山 育子 <kuriyama.ikuko*jaxa.jp>
Date: 2022/04/27 17:40
To: 'Joji Maeda'

Dear Joji-sensei,

Oh, the day finally comes. Thank you very much for your dedication and passion, which inspired us a lot! Your newsletters are always full of joy and love toward space and people, especially the young generation.

Best wishes for your new life, and I hope our paths will cross again soon.

Best regards,
Ikuko

Subject: Re: the final BPN issue
From: Reynel Josue GALINDO ROSALES (Honduras)
Date: 2022/04/27 19:31
To: George Maeda

Dear Prof. Maeda,

Thinking of past issues and how it impacted on our project, this is what I think would fit:

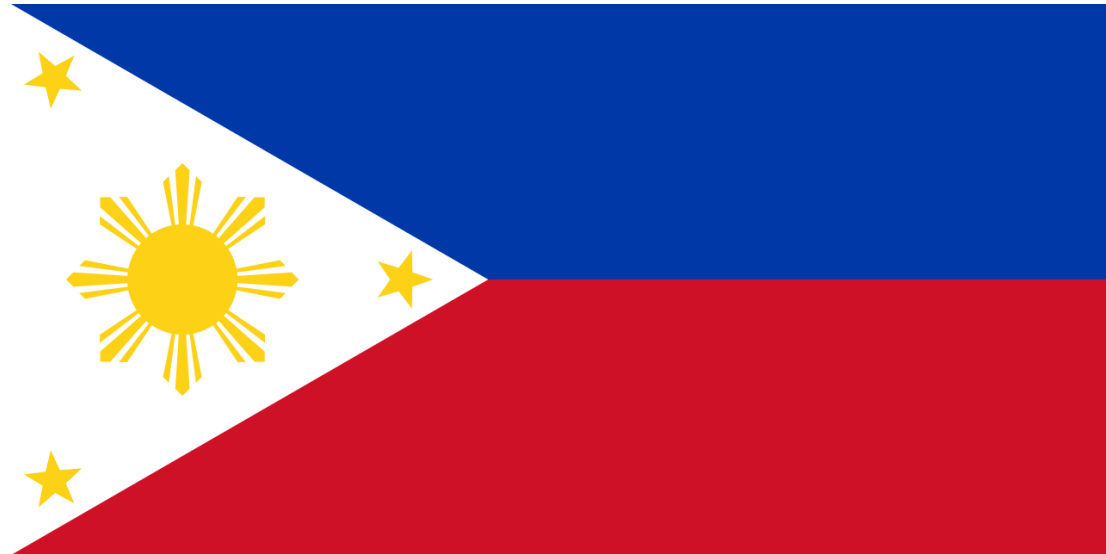
"The BPN has provided many examples of CubeSats from different regions and varied objectives and the story of the people working on them, showing non-space faring countries like mine that it is not just a dream or idea to get a satellite into space, but a tangible project that almost only requires developing human capabilities"

Let me know what you think and if it makes the publication.

Best regards,
Reynel Josué Galindo



**All of the following
messages are from the
Philippines**



“We are very grateful to the BIRDS Program, as it touches our lives in a different and exciting way. We gain a lot of new experiences, skills, and knowledge about space science and technology. It serves as a venue for us to meet and work with amazing people and gain new friends. With its newsletter, we were able to share our own journey, at the same time we learn more about the other members' experiences and achievements. Together, may we continue to pave new paths.”

Judiel Reyes

STeP-UP Scholar, Maya-3 and Maya-4 Team
STAMINA4Space

“I'd like to thank the BIRDS project and everyone affiliated to it as it gave us an opportunity to learn about nanosatellite design and operations. Not only that but made a lot of friends and memories along the way which we will forever cherish and remember.”

Angela Chua

STeP-UP Scholar, Maya-5 and Maya-6 Team
STAMINA4Space

“Dear Maeda-sensei,

Thank you for everything. Congratulations on your retirement! We wish you good health and lots of fun. Enjoy!”

Anna Alvarez

STeP-UP Scholar, Maya-5 and Maya-6 Team
STAMINA4Space

“Thank you very much Prof Maeda!! Surely you will be missed.”

Joseph Co
STeP-UP Scholar, Maya-5 and Maya-6 Team
STAMINA4Space

“The BIRDS project has been instrumental in bringing space technology in various nations. By establishing cooperation between institutions of different countries, space technology can become one step closer to the people. Kudos to all that has been part of this endeavor! Wishing for a happy retirement to G. Maeda!”

Derick Canceran
STeP-UP Scholar, Maya-3 and Maya-4 Team
STAMINA4Space

“Whether you're pursuing a new hobby or embracing la dolce far niente, we wish you the best of luck with the next chapter and we thank you for your hard work at the BIRDS project. Happy retirement, professor Maeda! Kanpai!”

Valerie Macaraeg
STeP-UP Scholar, Maya-5 and Maya-6 Team
STAMINA4Space

“It has been a pleasure to be a contributor to the BIRDS newsletter and to represent our country. We are thankful for this opportunity to share, learn, and communicate with the BIRDS and Space Technology community. To Prof. George Maeda, good luck on the next chapter of your life and I hope to see you soon!”

Ericka Picar
Information Officer
STAMINA4Space



“The BIRDS Newsletter was an integral part of the program’s publicity activities. It also helped build rapport between our counterparts in Japan. Thank you to everyone behind the BIRDS Newsletter!”

Katrina Mina

**Information Officer
STAMINA4Space**

“Thank you BIRDS project team for the opportunities to learn about space science and technology. Thank you all Senseis, student scholars, mentors and staff of Kyutech and other affiliated schools for the support in our development of Maya-3 and Maya-4! More Power to all involved in this amazing project!”

Marielle Magbanua-Gregorio

**STeP-UP Scholar, Maya-3 and Maya-4 Team
STAMINA4Space**

“Thank you BIRDS program for your support and guidance throughout the development of Maya-3 and Maya-4. You’ve been with us every step of the way. The newsletter, in particular, helped us received updates not just with the BIRDS program in KyuTech but also with other projects and advances in space engineering. I hope we can have more collaborations in the future. Kampai!”

Renzo Wee

**STeP-UP Scholar, Maya-3 and Maya-4 Team
STAMINA4Space**

“Congratulations to the team behind the newsletter and to all contributors for very informative content not just about Space Science and Technology but also about the wonderful places and cultures of participating countries. Thank you very much, BIRDS community for your support and guidance in the Maya-3 and Maya-4 development. Best wishes for your retirement, Maeda-sensei. :)”

Gladys Bajaro

**STeP-UP Scholar, Maya-3 and Maya-4 Team
STAMINA4Space**

“It has been our honor to have been part of the BIRDS Newsletter as a regular contributor. Congratulations and thank you to Prof. Maeda for encouraging us to share not just our technical and academic updates, but also snippets of our lives here in the Philippines. It has been a pleasure to have read the stories and progress of the contributors from other participating countries as well. Wishing the BIRDS network all the best!”

Nikki Ignacio

**Former Information Officer
STAMINA4Space**



**This is the end of
all messages
– thanks to all
who contributed.**

02. SEIC students send-off Adolfo (BIRDS-4 second project manager) at Fukuoka Airport

"Farewell Adolfo!"

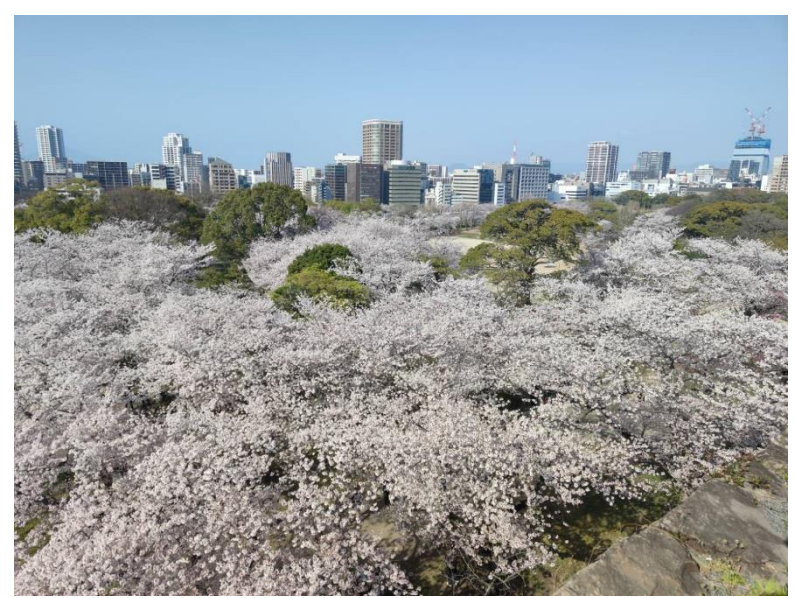
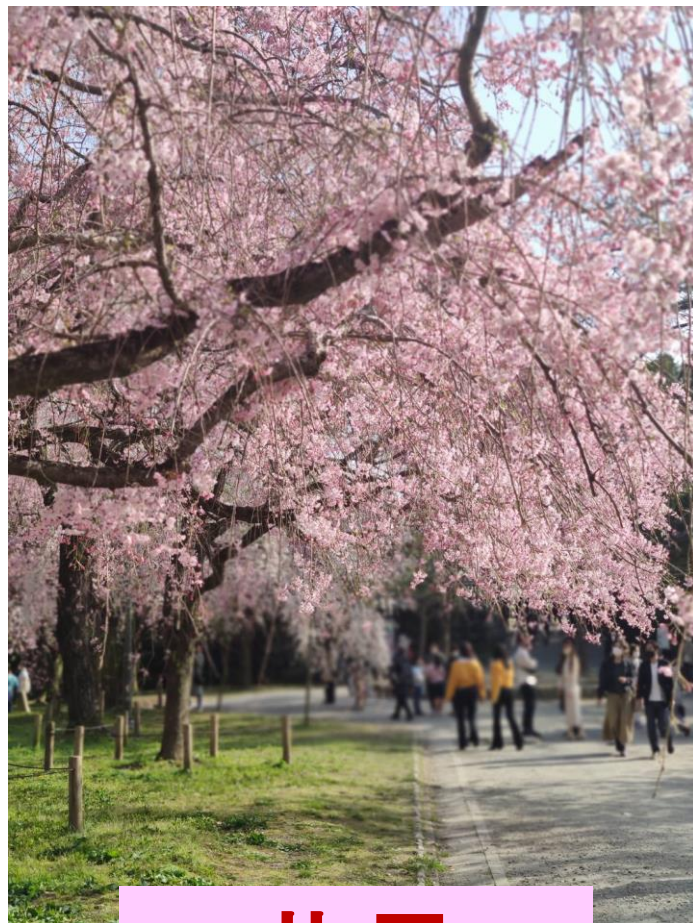


**Students send off
Adolfo at Fukuoka
Airport on 29 March
2022. He returns to
Paraguay.**



After sending off Adolfo at Fukuoka Airport, SEIC students did some *hanami* inside Fukuoka City ---these are their pics ... more on the next page.





花見
@
福岡市

03. Join the mailing list for “BIRDS Bus Open Source” information

"BIRDS Bus Open Source" Mailing List Application Form

The purpose of this mailing list is to distribute information regarding "BIRDS Bus Open Source" activities.

The aim is to share know-how and technical information regarding CubeSat development -- with a focus on the BIRDS Bus. This satellite bus was developed at Kyutech as a spin-off of the BIRDS Program (2015-2022). Kyutech offers all details of the BIRDS Bus on an open source basis (per MIT License).

The main goal is to provide a more solid basis for space programs in non-space faring countries by making satellite development easier, quicker, and less expensive. Starting from scratch is too much work.

By registering to this mailing list you will receive announcements related to BIRDS Bus Open Source activities, such as notices of upcoming webinars.

Mengu Cho, 7 April 2022

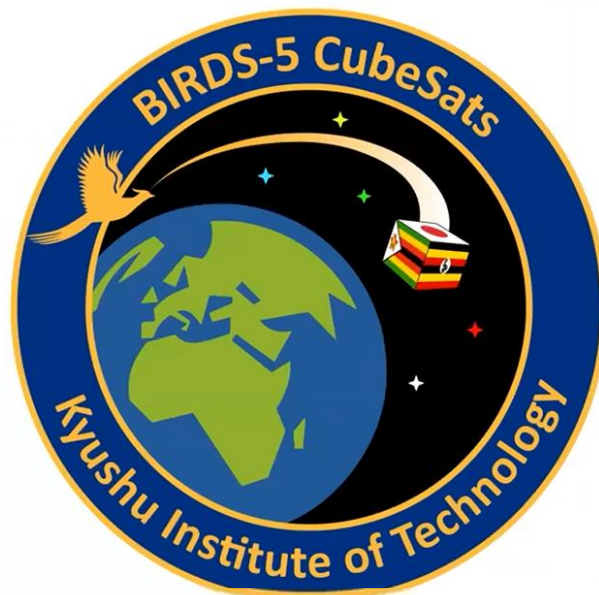
Name		※Required
E-Mail		※Required
E-Mail(Retype)		※Required
Affiliation		
Country		

Are you interested in building the first 1U CubeSat for your country, or state, or city, or school?

Then join this mailing list. You would learn stuff, and make news friends.

GOTO HERE TO REGISTER: <https://lean-sat.org/opensource/>





BIRDS BUS Open-source Webinar

By: Victor Mukungunugwa
BIRDS 5 Project Manager

You can view the
BIRDS-5 team's
presentation
during *BIRDS
Bus Open Source
Webinar #4*.

Just use the link
below.
*The next
webinar is on
14 May.*

RECORDING OF BIRDS BUS WEBINAR #4:

https://lean-sat.org/images/videos/birds_bus_opensource_webinar_4.mp4



UiTMSAT COLUMN

Column No. 28

Editor: FATIMAH ZAHARAH BINTI ALI
(ali.fatimahzaharah@gmail.com)

PhD CANDIDATE/PROJECT MANAGER OF ASEANSAT
SCHOOL OF ELECTRICAL ENGINEERING, COLLEGE OF ENGINEERING
UNIVERSITI TEKNOLOGI MARA (UiTM), SELANGOR, MALAYSIA

04. Column #28 from Malaysia



UNIVERSITI
TEKNOLOGI
MARA

UiTM Sentiasa Di Hatiku
"UiTM Always in My Heart"

ASEANSAT PROJECT: STRUCTURE SUBSYSTEM

STRUCTURE subsystem is an important and crucial mechanical integrity for a satellite. Like a skeleton of a human body, that is how the analogy can be given to show the level of criticalness and significance of installing the structure subsystem of a spacecraft. Without the structure subsystem, there will be no foundation to hold and support the other subsystems and components of the satellite.

Satellite's structure must be designed not only to accommodate the subsystem and mission boards into one configuration, but it must be able to withstand all of the conditions imparted from the launcher during the launching and space environment during the operation. To meet this objective, the structure subsystem must be designed and fabricated using appropriate outline and material, and this is usually done based on the

requirements specified by the launcher provider.

The information of the requirements that includes the technical interfaces, integration, and safety necessities can be obtained from the manual provided by the launcher provider. Like ASEANSAT which is the subsequent CubeSat to the UiTMSAT-1 (BIRDS-2 project with Kyutech), the deployer of the Japanese Aerospace Exploration Agency (JAXA) will (as planned) be used to release the spacecraft into the space. Thus, the Japanese Experimental Module (JEM) Payload Accommodation Handbook is referred as the manual to design and develop the CubeSat appropriately, especially on the structure part.

In the project of ASEANSAT, the structure subsystem was in-charged by Ms Nor Shazwaney Atiqah. She had performed simulation, computation, and analysis of the structural modelling.

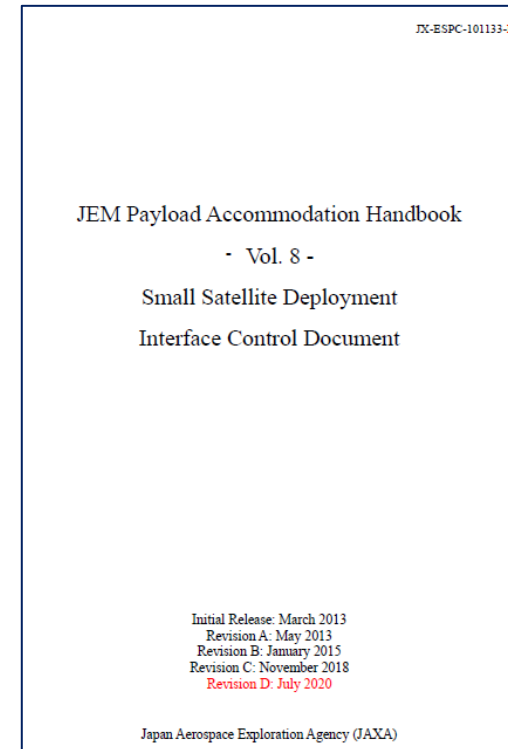


Fig. 1: Manual used as reference to develop the CubeSat based on requirements specified by the launcher provider.



Fig. 2: Credit to Ms Shazwaney Atiqah who was the person-in-charge (PIC) of structure subsystem of ASEANSAT. In this column, most of the information was gathered from her hard works.

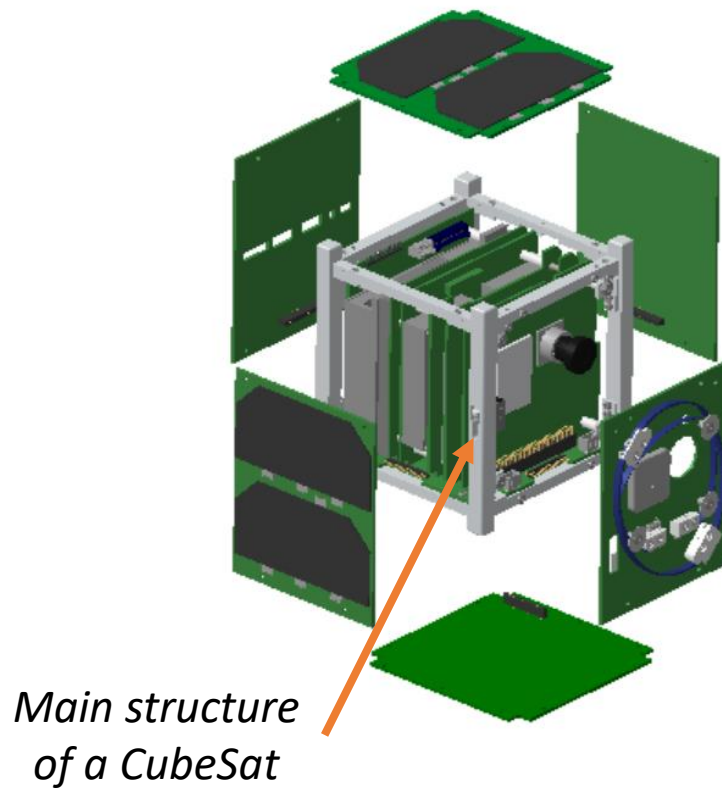


Fig. 3: Exploded view of 1U CubeSat to see the design of the main structure for small spacecraft.

The ASEANSAT's CubeSat development is also referring to the bus system of the BIRDS's Nanosatellite and most of sources are taken from BIRDS-4. Thus, the material, composition and other mechanical properties applied for the CubeSat's structure are similar to the reference BIRDS's Nanosatellite.

Based on latest requirement of the deployer, there will be no more deployment switch allowed to be installed on the rail of the structure. In the new design, the deployment switch must be located on the end or tip of the rail instead. Thus, necessary changes of structure design was performed. The new design was then being analyzed computationally through a modeling computer-aided design software.

In order to accelerate the integration process of subsystem and mission boards during the testing

phase, the existing design of structure was sent to fabrication process in Standard and Industrial Research Institute of Malaysia (SIRIM) Berhad. SIRIM is one of the government organizations that handles machinery operations for research and technology development and provides the service for inspection and certification. Besides of the main structure that was sent to SIRIM for fabrication, the designs of shield for OBC/EPS board and battery box were also submitted to SIRIM for manufacturing. Before all of the designs were sent to SIRIM for such services, the Non-Disclosure Agreement (NDA) contract was bound between UiTM and SIRIM in order to ensure all of the given information is made and treated confidentially.



Fig. 4: Some of the parts (rails/frames) of the main structure of the ASEANSAT's CubeSat that were fabricated by SIRIM. Since the objective of fabricating the structure subsystem is to speed up the integration and configuration process of the CubeSat for testing purposes, the manufacturing of the structure was made without aluminum anodizing operation.

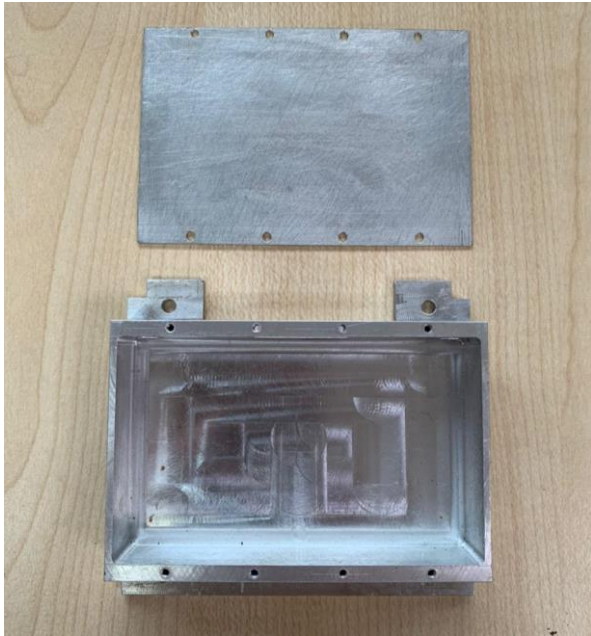


Fig. 5: Fabricated battery box.



Fig. 6: Fabricated OBC/EPS board shield.

If the reader can have a closed-up view of the images in Figure 4 – 7, it can be seen that there is some wavy surface on the fabricated structures. The surfaces are actually smooth to touch but the wavy look is because of the finishing treatment that was not performed to all fabricated structures. This will be done in the next fabrication for the new design of structure.

By using the fabrication services from SIRIM for the mechanical structures of the ASEANSAT project, the objective of the development which is to utilize the local facilities and expertise is achieved. And this can also be the steppingstone to introduce the space technology to the nation and widen the view of the organization towards the new space advancement.



Fig. 7: Other fabricated frames.

**End of Malaysia's
Column**

05. G.Maeda retires from Kyutech this month; his successor is T.Fuse



布瀬さん
T. Fuse

G. Maeda (7-year veteran of SEIC) passes the SEIC baton from himself to T. Fuse, who is an 18-year veteran of JAXA.

On following pages,
he explains his background.

JAXA Aerospace activities and Innovation by the Space Exploration

Tetsuhito Fuse

Space Exploration Innovation Hub Center

Feb. 26, 2022

(Kyutech from Apr. 01, 2022)

Today's Topics

- **Self Introduction**
- **JAXA Introduction**
- **Innovation and Space Exploration**
(How Japan started space exploration program and joining Artemis program in 2019)

Introduction

Tetsuhito Fuse

Hobby : Travel abroad

2004 : Graduated Applied Physics Master Course

2004 : Joined JAXA

2004 : Satellite operation and network control department

2010 : International Space Station Directorate

2014 : Strategic Management Department (HQ)

2016 : Space Exploration Innovation Hub Center

2020 : MOT (Titech)

2022 : Joined Kyutech on 1st April

History of JAXA

1955 Japanese First Pencil-sized rocket launched by Univ. of Tokyo

1970 First satellite “OHSUMI” into orbit launched by Univ. of Tokyo

2003 Established JAXA with the merger of 3 institutions Designated as a core implementing agency for Japan’s overall aerospace development and utilization

more than 60 years history



since 2003



JAXA Activities

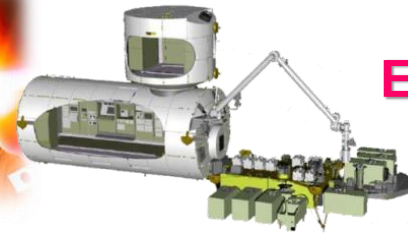
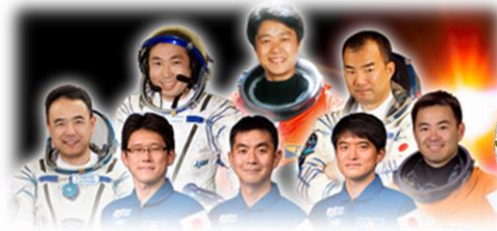
**Space
Transportation**



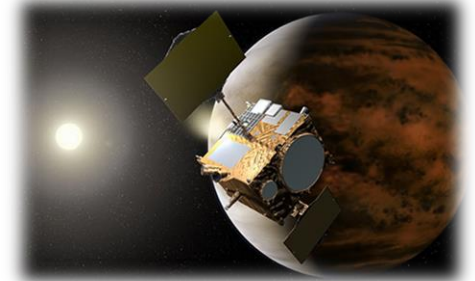
Human Space Activities



Satellite Program



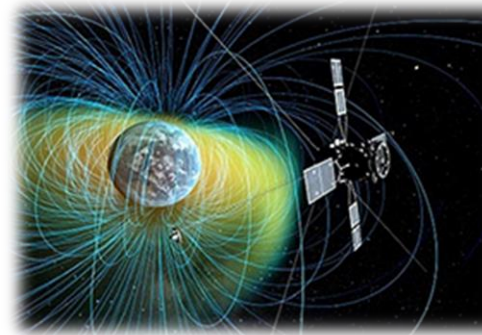
**Lunar & Planetary
Exploration Program**



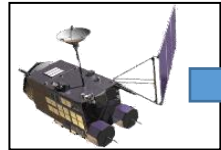
Aviation Program



Space Science



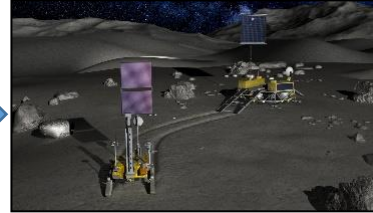
JAXA's Planned Missions (Moon & Beyond)



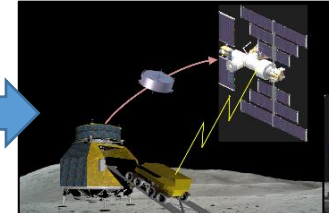
SELENE
(2009)



SLIM (JFY2023)



Traversing Exploration
Prox. 2025-
FS with ISRO



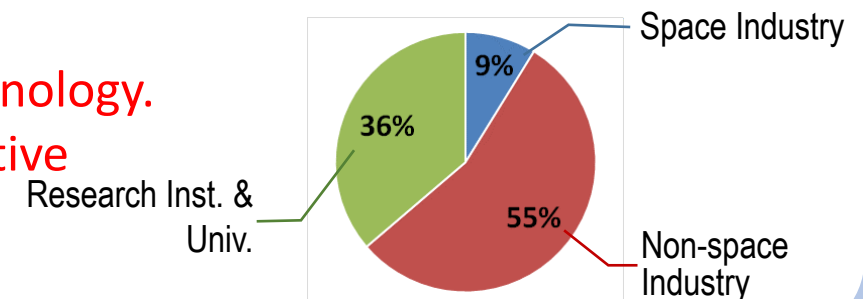
Sample Return
Prox. 2027-



**Full-fledged Exploration/
Utilization**

JAXA Space Exploration Innovation Hub

- JAXA & private companies / research institutes bring together cutting-edge technologies for space exploration
- Taking full advantage of terrestrial technology.
- Contribution to our planet with innovative technologies.



Role of Space exploration Innovation Hub

- ✓ Creation of innovative technologies utilizing space exploration field.
- ✓ Involvement of many non-space sectors using open innovation scheme.



- ✓ Tried to fill the blank between 2014 and 2019 when Artemis program started.

How JAXA established space exploration program

- ✓ In 2015 JAXA has no exploration mission after Hayabusa2.
- ✓ In 2009 JAXA launched lunar mission SELENE, and had tried to start SELENE2 mission but failed 2013.
(long blank to start new lunar exploration mission)
- ✓ April 1, 2015: “The National Research and Development Agency” system was established. (Ref; Independent administrative institution)
- ✓ Creation of innovation centered on national R&D agency is one of the priority measures in the Comprehensive Strategy for Science, Technology and Innovation 2014(b48 Cabinet Office).
- ✓ In 2015 JAXA established the "Open Innovation Hub for Space Exploration“ under The Japan Science and Technology Agency(JST) support program. (No exploration mission at this moment)
- ✓ This program leaded to the preparation for the space exploration program and joining Artemis program NASA leads.

Today's Topics 2

➤ **My personal story about backpacking**

My backpacking travel concept



- ✓ Connecting short trips into a travel around the world by land (One of my dreams)
- ✓ Use land borders to cross as many countries as possible during the holidays
- ✓ To realize the goal, taking as long a vacation as possible for Japanese salaryman
- ✓ Maximum 10 to 13 days, 3 times a year (New Year recess, Golden Week recess, summer vacation)

Trip Experience (not including business trips)

2003 : India

2004 : Hungary - Romania - Bulgaria - Turkey - Syria - Jordan - Israel - Egypt

2004 : Venezuela

2005 : Malta

2005 : Thailand - Cambodia - Vietnam

2005 : China

2006 : Sri Lanka

2006 : Yemen

2006 : India

2007 : Nepal

2007 : Spain - Morocco

2007 : Costa Rica - Nicaragua - Honduras - Guatemala

2008 : Brazil

2008 : Taiwan - Philippines

2008 : Vietnam - Laos - Thai



Trip Experience (not including business trips)

2009 : Philippines

2009 : Taiwan

2010: China - Malaysia - Singapore

2011 : Laos -Thai - Taiwan

2011 : China - India - Bangladesh - Nepal

2012 : China - Kazakhstan - Kyrgyz

2013 : Peru - Bolivia - Brazil

2013 : Korea

2013 : Iran - Armenia - Georgia - Turkey

(2014 to 2015 : I was at JAXA HQ)

2016 : Indonesia

2016 : Thailand

2017 : Kenya - Morocco - Spain - Portuguese - England

2017 : Germany - England - France - Spain

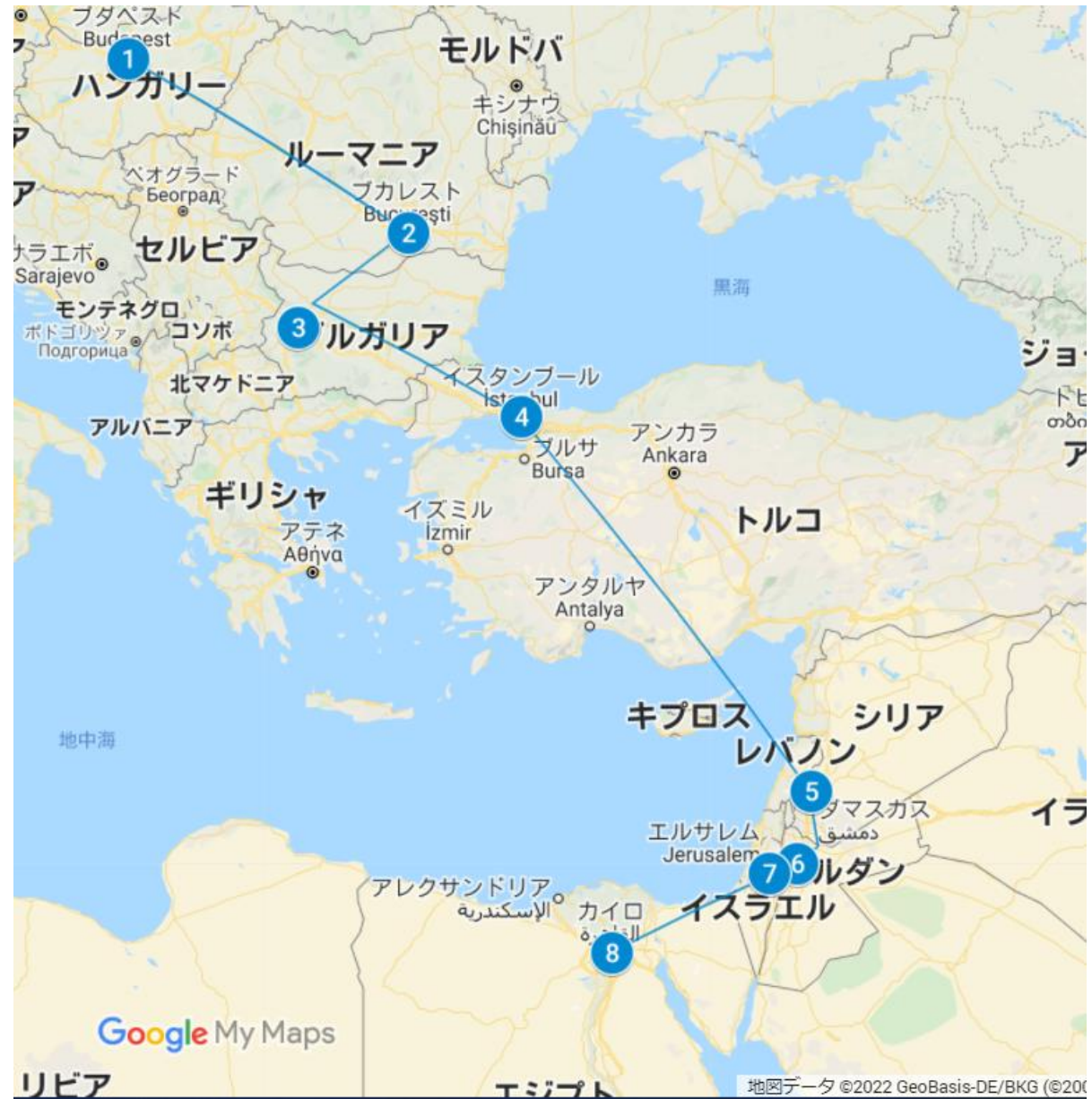
2018 : Myanmar - Thailand

2019 : Singapore



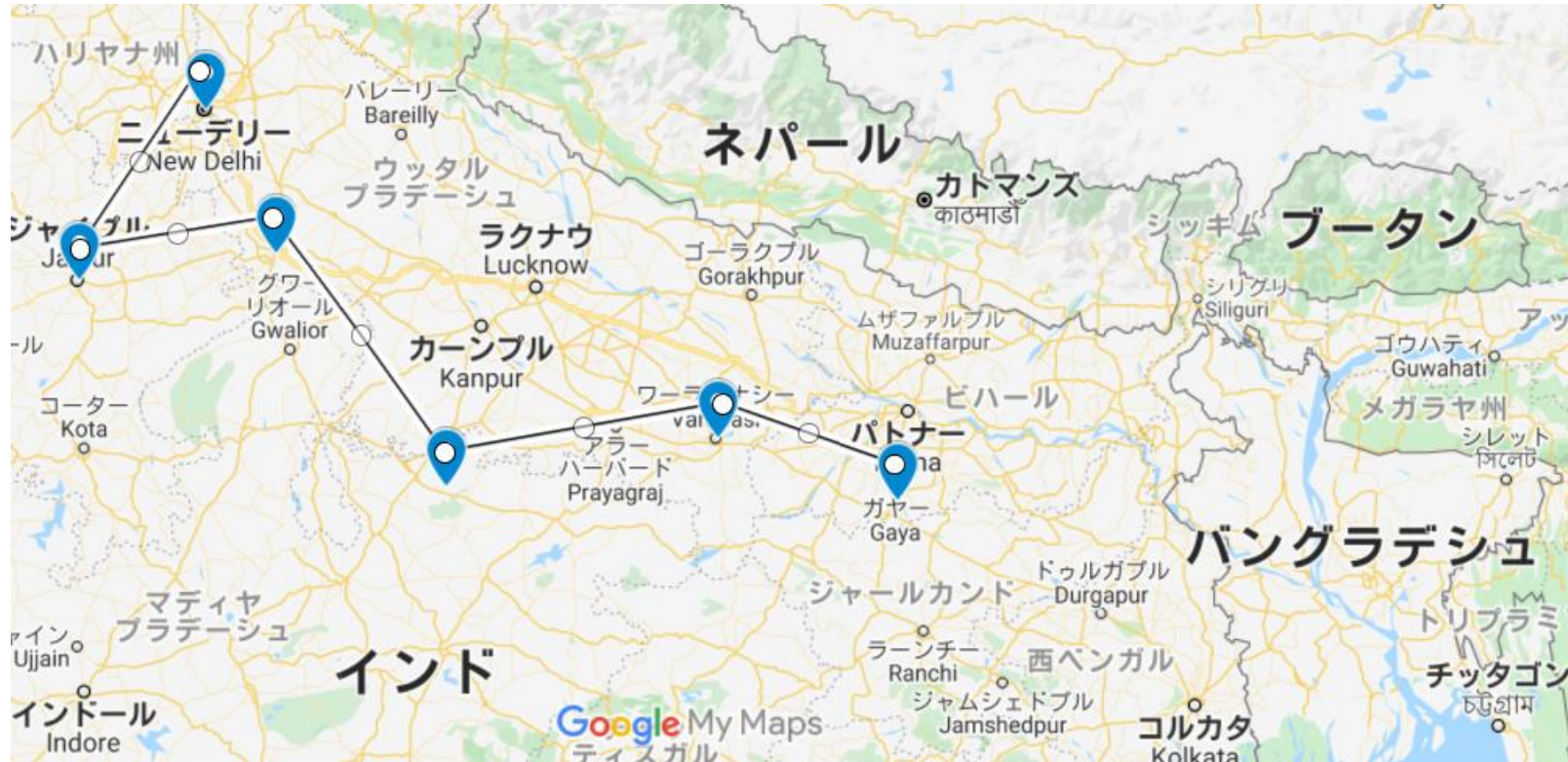
Sample trip

Hungary to Egypt

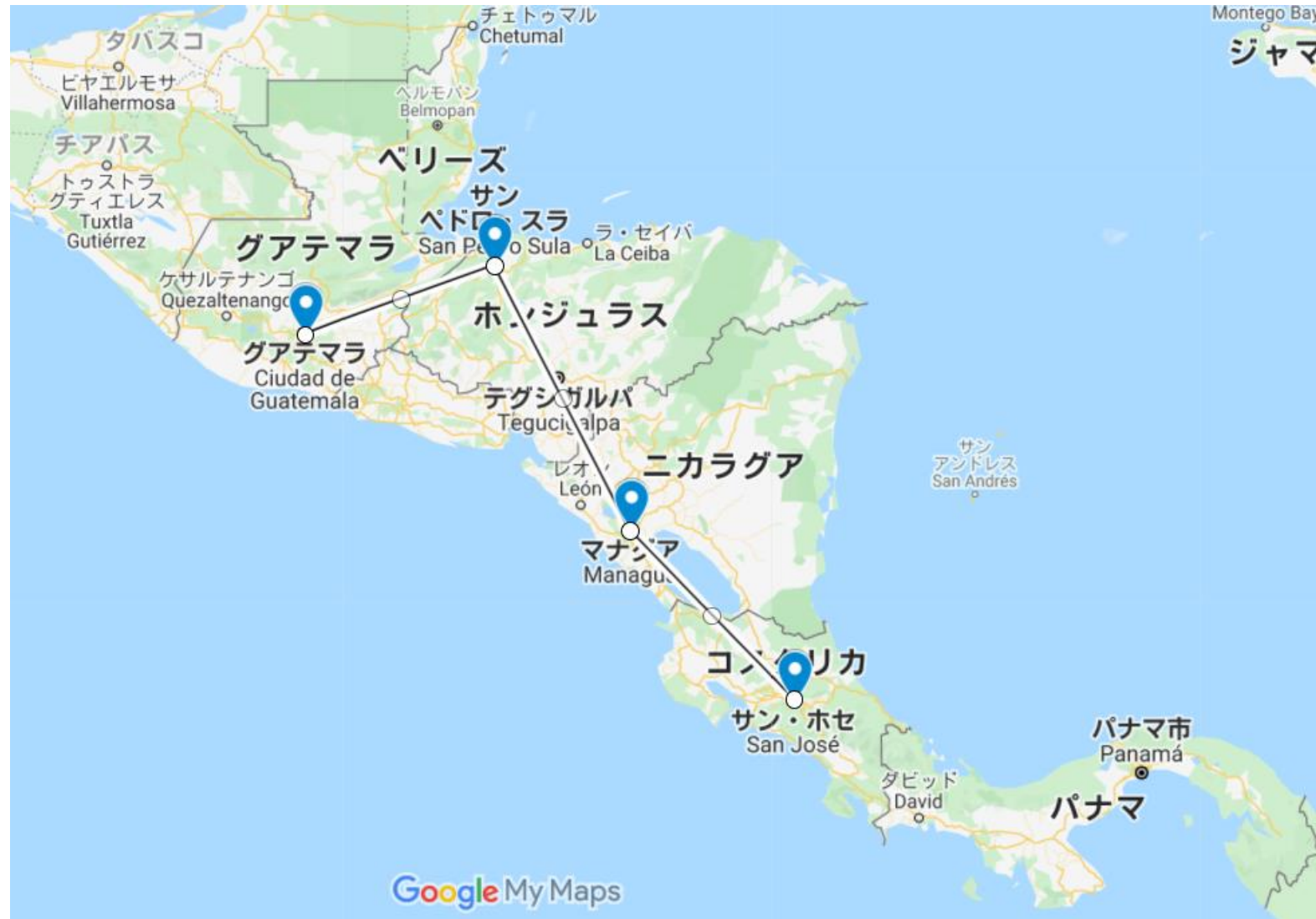


Sample trip

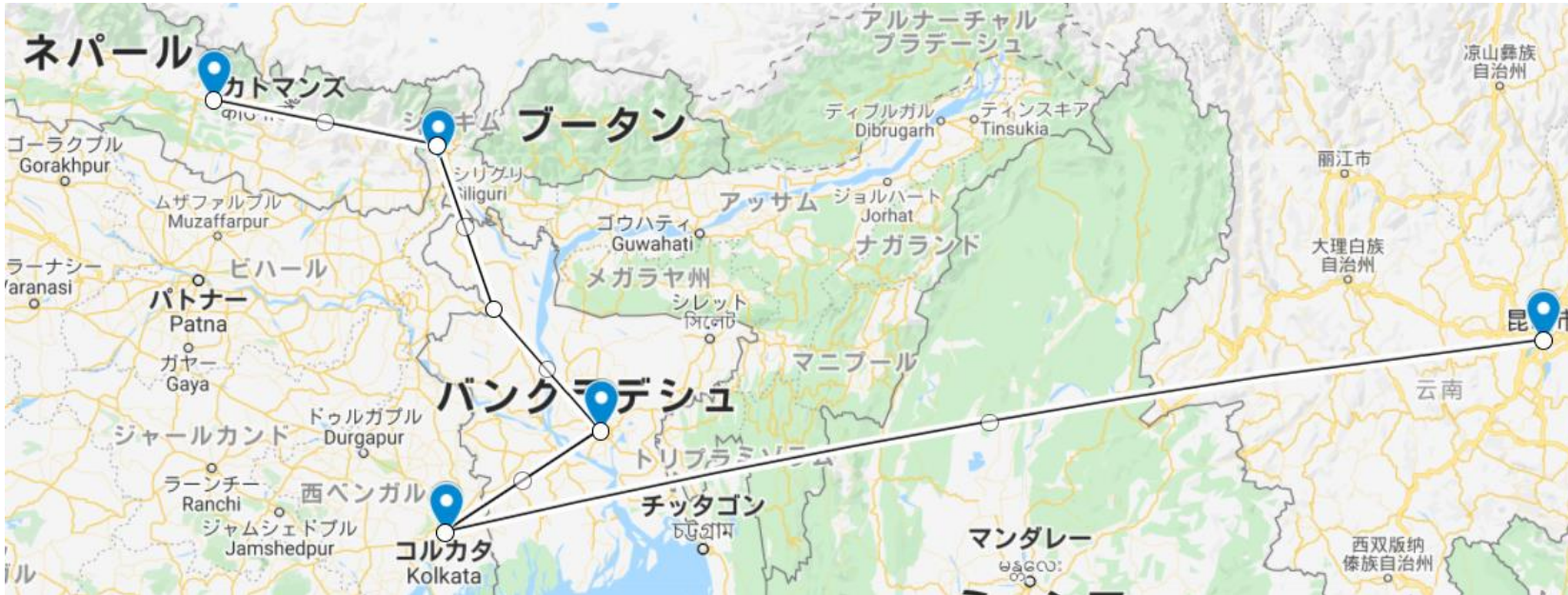
New Delhi to Budha Gaya



Costa Rica to Guatemala



Calcutta to Khatmundu

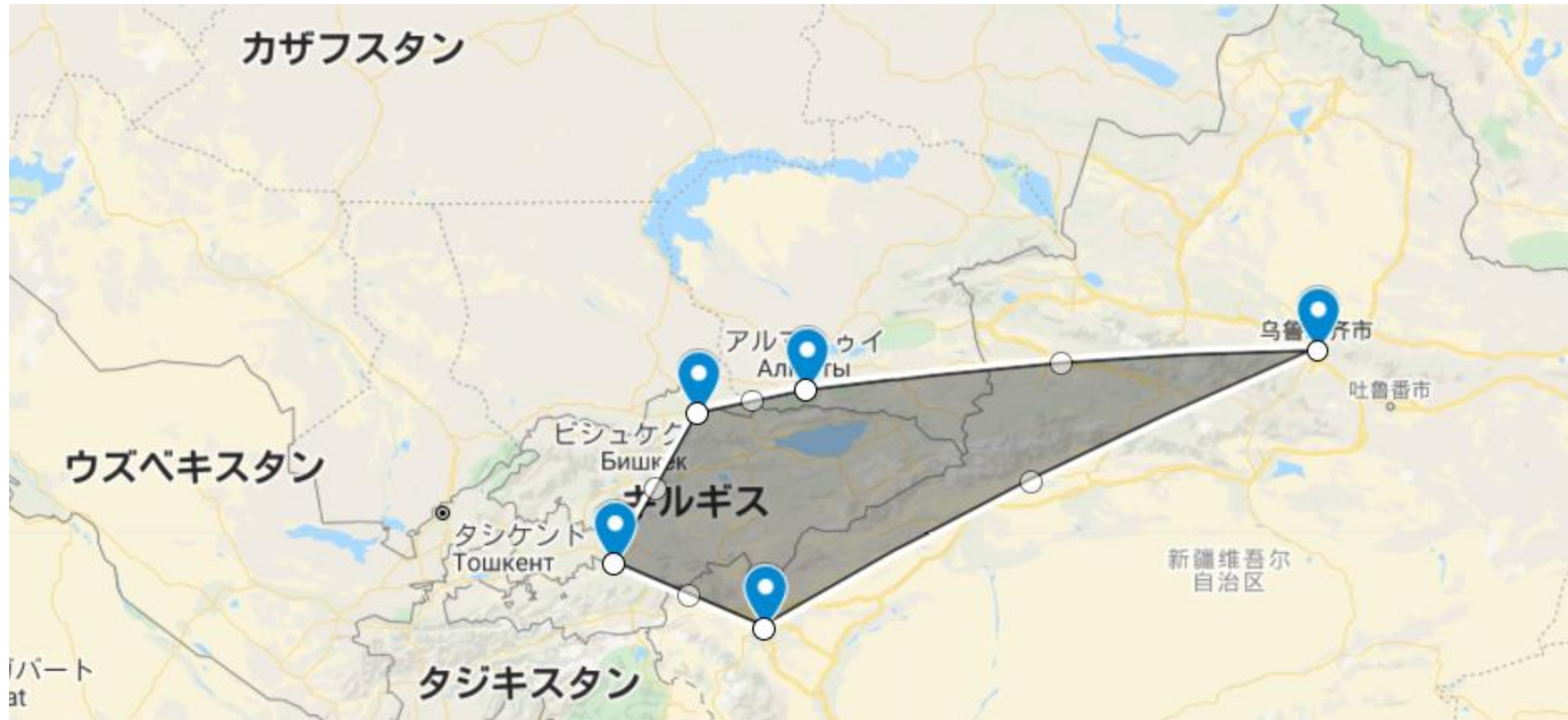


Teheran to Istanbul



Sample trip

Urumqi to Almaty to Bishkek to Kaxgar



Border from Kyrgyzstan to China

Sample trip



Mr Fuse is a backpacker

-- from his Kyutech job application:

In addition, my interest in international exchange can be noted as a reason for my desire for diplomacy and exchange with emerging countries. *Since I was a student, I have been carrying a backpack on my vacation for the travel of emerging countries.* In this process, I have been thinking that I would like to acquire the concept of world standards by continuing to learn different cultures and common sense from Japan.

I have visited more than 70 countries and regions in the past. Through this experience, I have the perspective of utilizing space development for the development of not only Japan but also the world.

**End of
self-introduction
by T. Fuse**

06. G.Maeda gave Farewell Address to meeting of SEIC Town Hall



← SEIC logo was designed by Hala (graduated SEIC in Sept. of 2015)

**Farewell address to all SEIC
alumni from SEIC Coordinator
(2015-2022)**

**SEIC Town Hall Meeting #19
23 April 2022**

**G. Maeda
Assistant Professor, Kyutech**

SEIC Town Hall Meeting #19 – 23 April 2022

Page 1 of 89

During the *SEIC Town Hall* meeting of 23 April 2022 (Meeting #19), G.Maeda delivered his *Farewell Address*.

With the link below you can download the 11-MB presentation file – it has mainly old photos.

View the presentation file:

<https://www.dropbox.com/s/73hfg4ulw0hoj9p/SEIC%20Farewell%20address%3B%2023-4-2022.pdf?dl=0>

**The following are
sample slides
from the
presentation file**

I encouraged students to eat together in the cafeteria



Werner Balogh, Ian Ruxton, Juan Jo



Meals with students 2/9



Lots of Christmas parties



Meals with students 3/9



Meals with students 4/9



Irish Pub (Kokura)

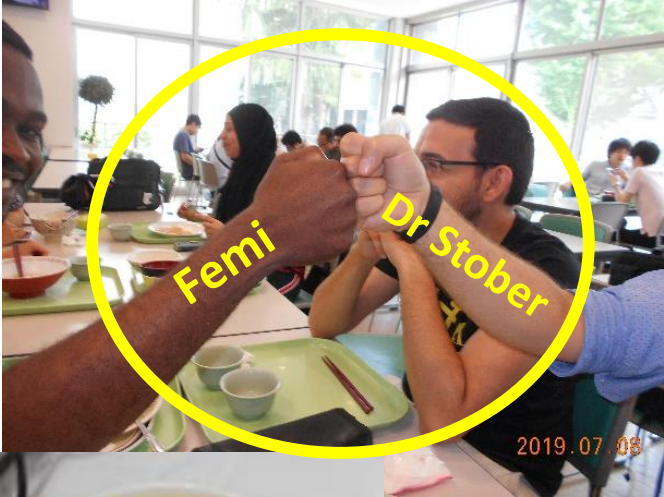


Delicious Japanese food

Welcome Back Werner



Meals with students 5/9



Above:
Party at SVBL



Engineers from
Thailand



Meals with students 6/9



Two new
guys from
Cal Poly
(welcome
lunch)



Breakfast with
Zwe in Myanmar
(July 2019)



Lunch of 15 July 2019



Celebrating 海の日
with Prof. Dianne



Meals with students 7/9



HEPTA-Sat @ Tokyo



Welcome dinner for Zwe
and his brother



BIRDS-EPS

LaSEINE, Kyushu Institute of Technology, Japan
12 April 2022



Tests conducted by:

Hari R. Shrestha

Adolfo JARA

Izrael Bautista

Marloun Sejera

Report prepared by: Hari Ram Shrestha, D2 Student

Power generation simulation using MATLAB (1/2)



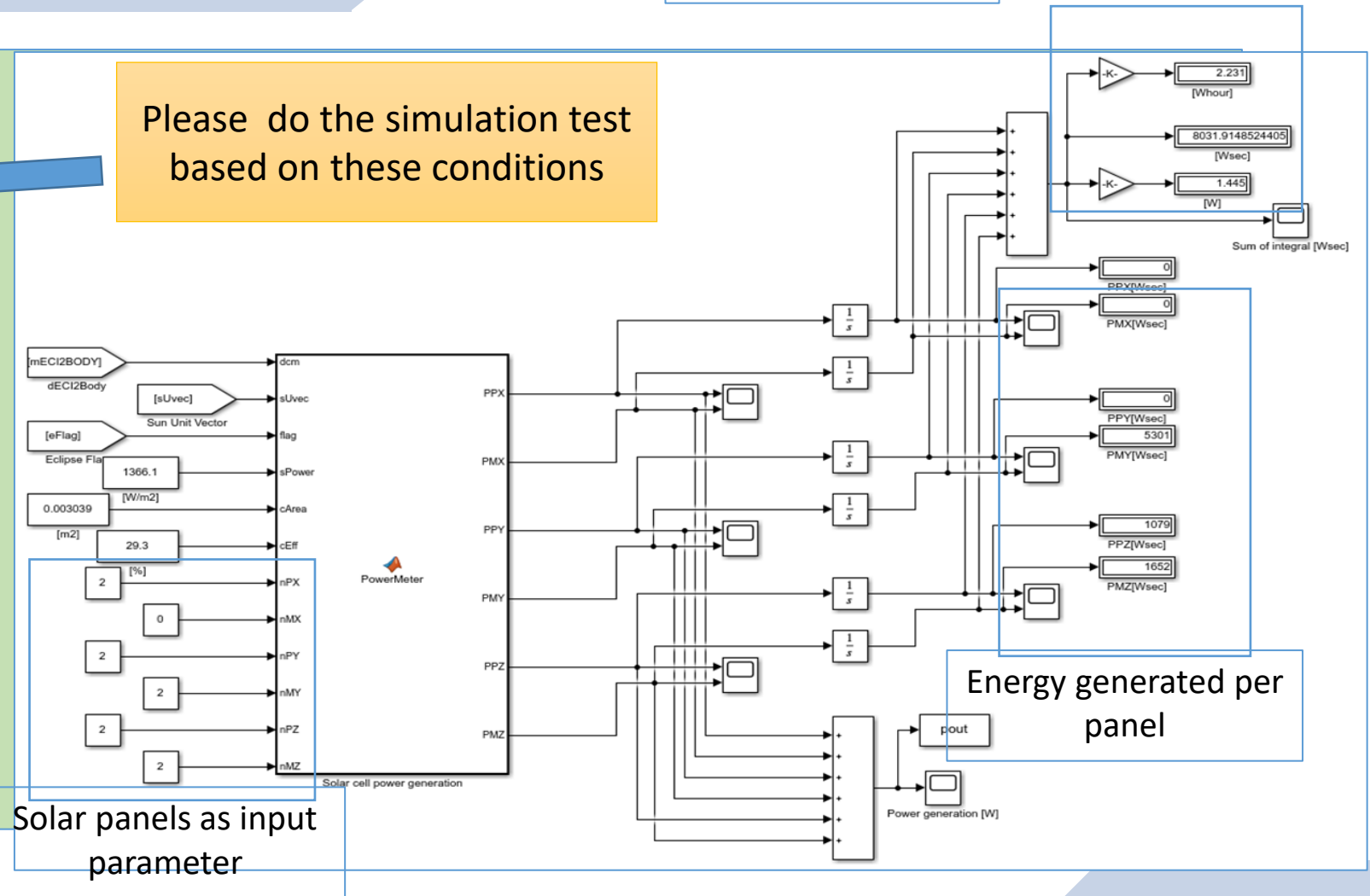
Kyutech
Kyushu Institute of Technology



Total energy and
power generated

- Edit Master text styles
 - Second level
 - Third level
 - Fourth level
 - Fifth level

Please do the simulation test
based on these conditions

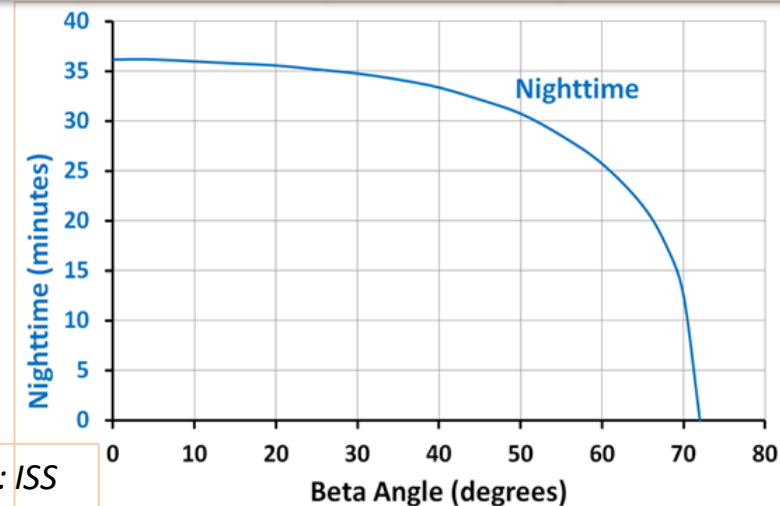


Power generation simulation using MATLAB (2/2)

Parameters	Unit	Beta angle = 30 deg. Eclipse time = 35 min.			Beta angle = 73 deg. Eclipse time = 0 min.		
		5	4	3	5	4	3
Solar panels	-	5	4	3	5	4	3
Total Energy generated, A (MATLAB simulation)	mWh	2,173	1,875	1,419	3,447	2,980	2,252
Energy consumed by blocking diodes, B (Measured)	mWh	240			360		
BCR efficiency, C (Measured)	%	80			80		
Total Energy after BCR, D $D = (A-B)*C$	mWh	1,546	1,308	943	2,470	2,096	1,514

NOTE:

- Blocking diodes and buck-boost DC/DC converter (BCR) were characterized to obtain the measured values. Details can be found in the Appendix.

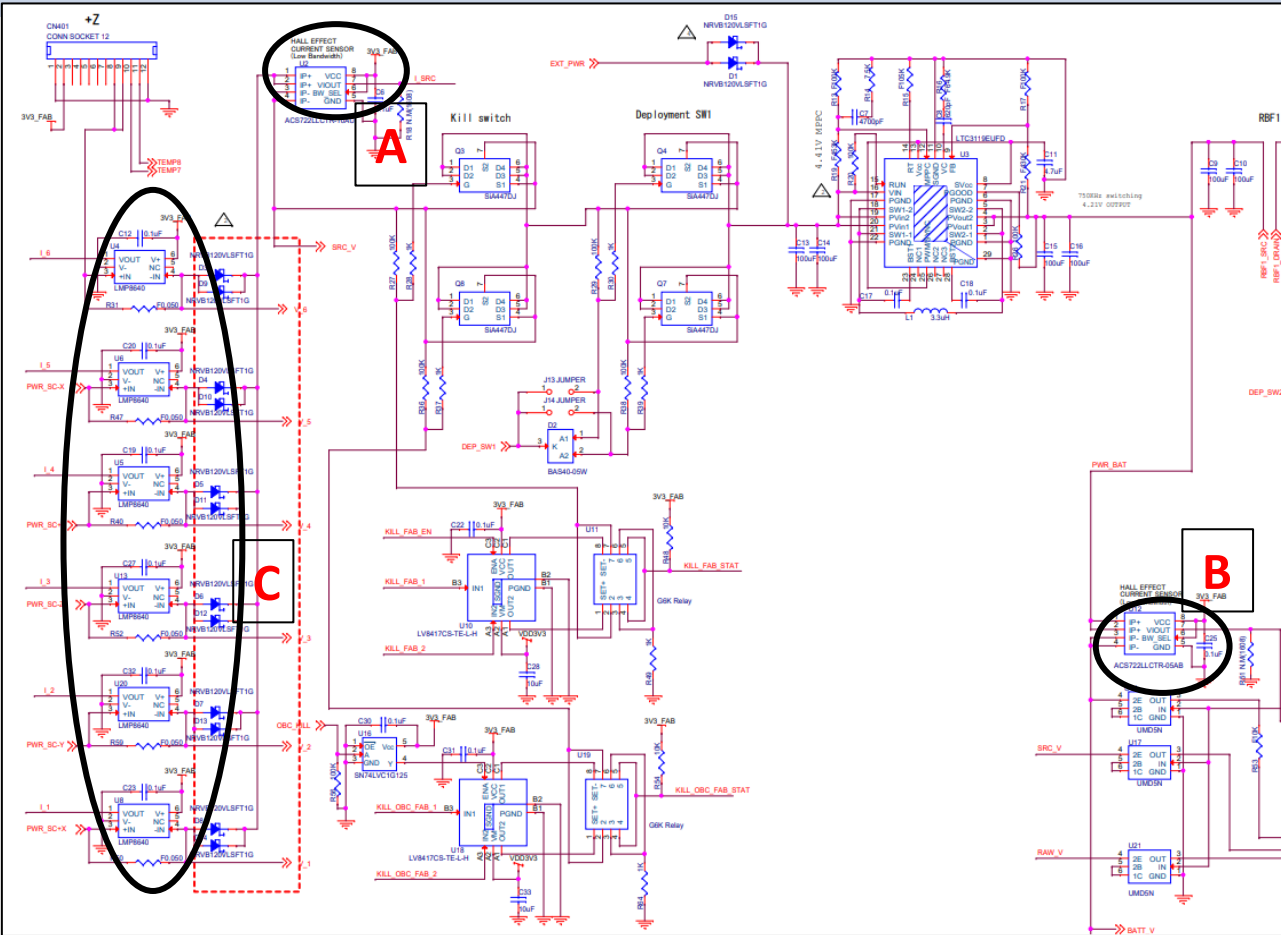


BIRDS-4 Power Consumption (Measured)

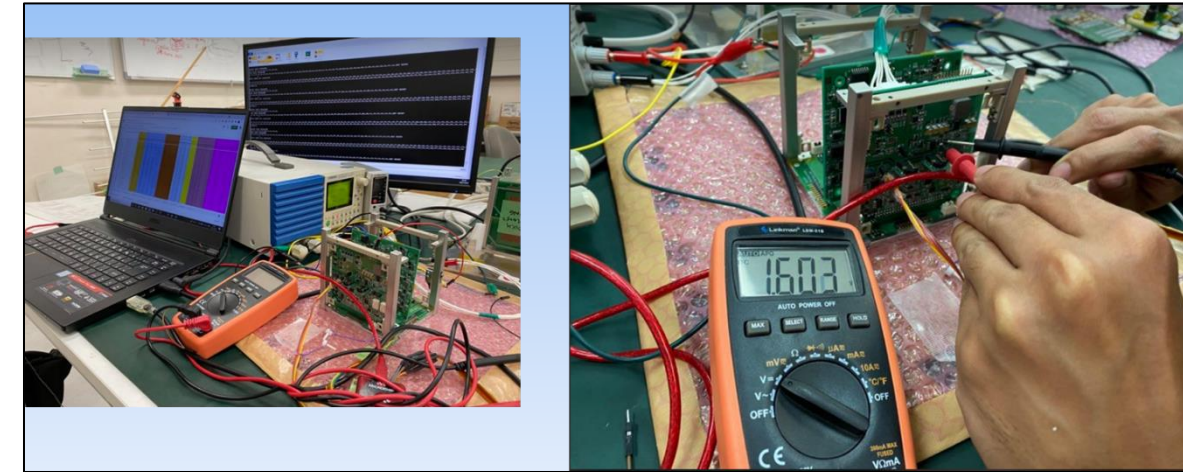
- Power consumption per subsystem and per payload were measured
- The duration where subsystem and payload were ON is based on 90-minute orbit
- At nominal mode, BIRDS-4 satellites energy consumption is at 1,438 mWh**

COMPONENTS	OBC-EPS and FAB	COM UHF (RX)	COM UHF (TX-CW)	COM UHF (TX-Telemetry)	APRS-DP SF-WARD (RX)	APRS-DP SF-WARD (TX)	CAM	TMCR	PSC	HNT	ADCS (Stabilization)	ADCS (MCU and sensors ON)	ADCS (Pointing Mode)	GPS	ADCS (Detumbling Modde)	Mission Boss	Battery Heater	TOTAL ENERGY CONSUMPTION per Mission (mWh)
Maximum power allocated (mW)	428	144	280	4620	135	1400	300	50	16.5	500	0.75	188	1000	240	467	80	440	1438
Duration per orbit (h)	1.5	1	0.5	0.13	0.25	0.11	0.017	1.5	1.5	0.25	1	1.5	0.5	1.5	1.5	1.5	0.250	
Energy per Orbit (mWh)	642	144	140	600.6	33.75	154	5.1	75	24.75	150	0.75	282	500	360	700.5	120	110	
Nominal Mode	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	ON	1438

Current sensors calibration



BIRDS-4 FAB schematic



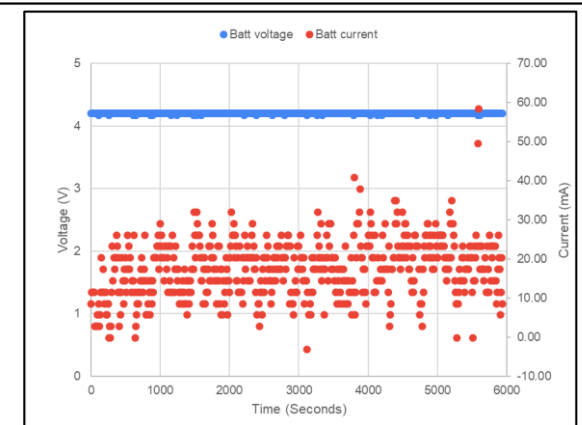
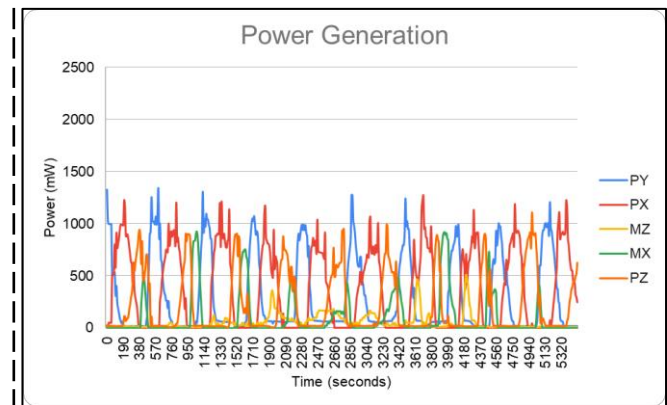
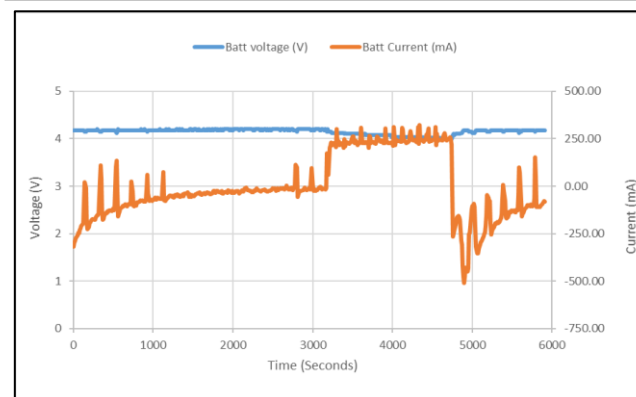
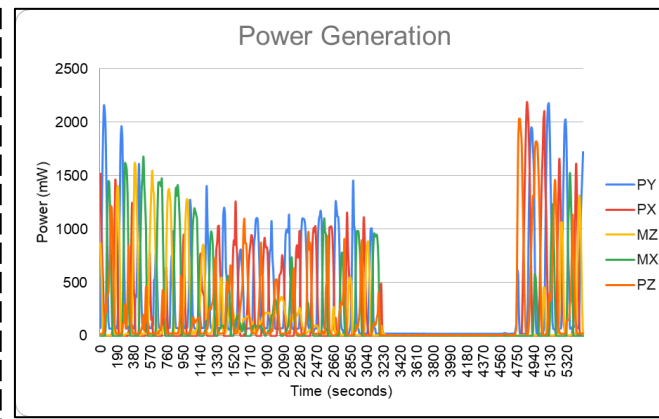
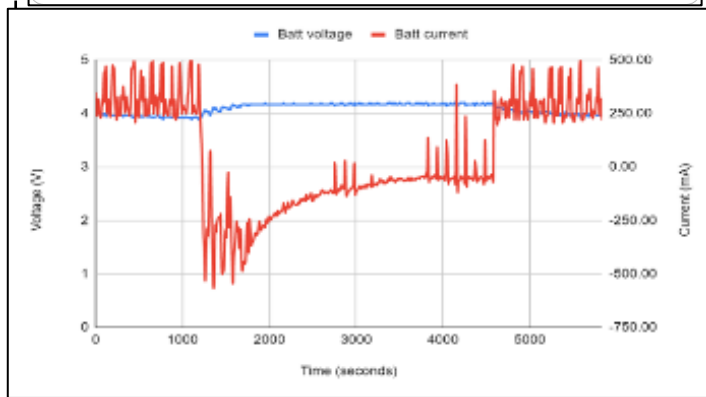
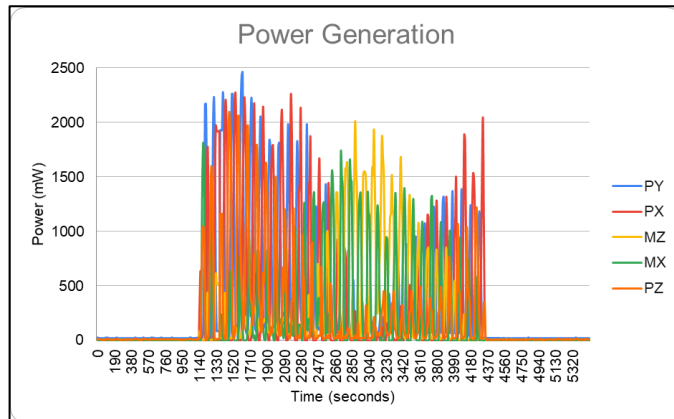
- Measurements were taken on the source current sensor (**A**), battery current sensor (**B**), and individual solar panel source current sensors (**C**) with under different temperature conditions: +25 degC, +60 deg C, -10 degC
- Based on the measurements, each sensor's HK data formula were updated.

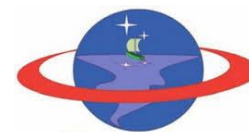
Power generation (Tsuru on-orbit data)

Date	June 1, 2021	July 9, 2021	July 17, 2021
Beta angle	0 deg	50 deg	70 deg
Power Generated	1,790 mWh	1,658 mWh	1,560 mWh

- Conditions**
- 5 panels working
 - GPS is OFF
 - Battery heater is OFF

- Observation**
- Generated power is highest at 0 deg beta angle



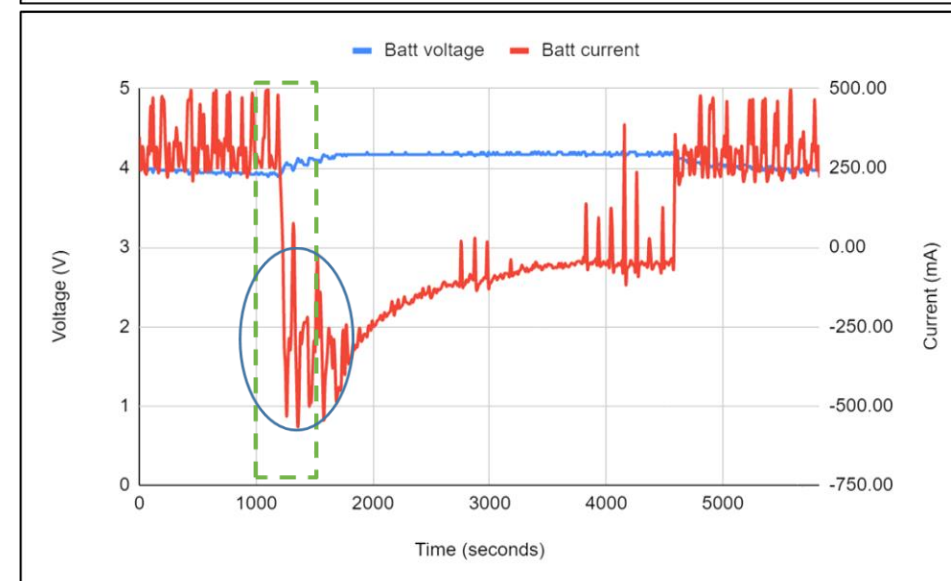
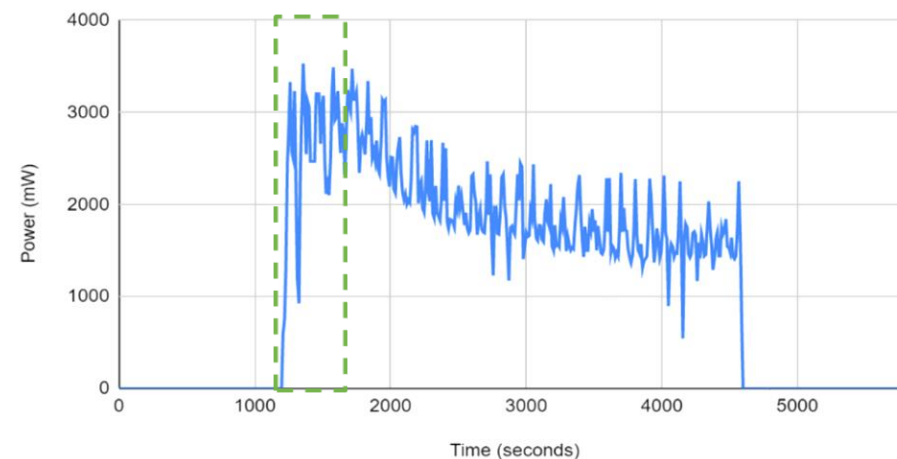


Kyutech

Available power to the load at 0 deg Beta angle (Tsuru on-orbit data)

- At 0 deg Beta angle, sunlit period is at 3,380 seconds (~56 min.)
- It takes around 600 seconds for the battery to charge and reach 4.2 V when the satellite transitions from eclipse to sunlit.
- The average power generated during the 600 seconds period is 2,670 mW.

SRC Power Generation



Parameters	Unit	Beta angle = 0 deg. Eclipse time = 36 min.		
Solar panels	-	5	4	3
Generated power	mW	2,670	2,136	1,602
Generated energy, A	mWh	2,507	2,005	1,504
Energy consumed by blocking diodes, B	mWh	240	192	144
BCR efficiency, C	%	80		
Energy loss at battery, D	mWh	210		
Available Energy to the load, E E = [(A - B)*C] - D	mWh	1,604	1,240	878



BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS
SATELLITE PROJECT



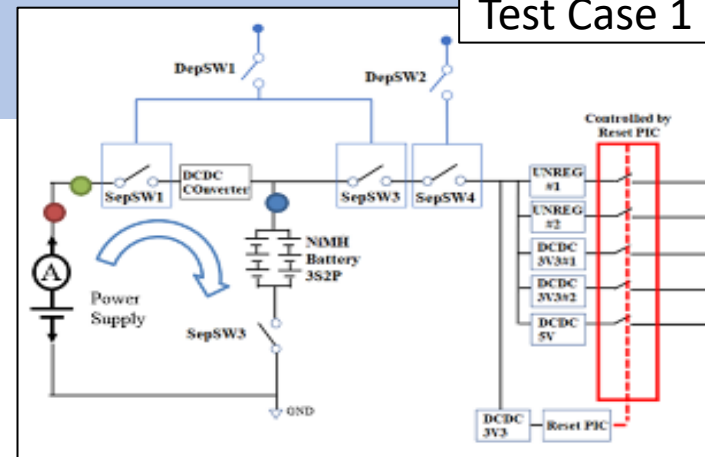
BIRDS-4 EM satellite test (1/2)

- EM satellite was used to verify the power consumption.
- Test cases
 1. With fully-charged battery
 2. Without battery
- Test setup:
 - antenna deployed
 - all internal boards are connected to the backplane
 - no solar panels
 - regulated power (4.2 V) supplied to the satellite through FAB J5 connector for case 1 and solar panel connector for case 2
 - GPS and battery heater are OFF

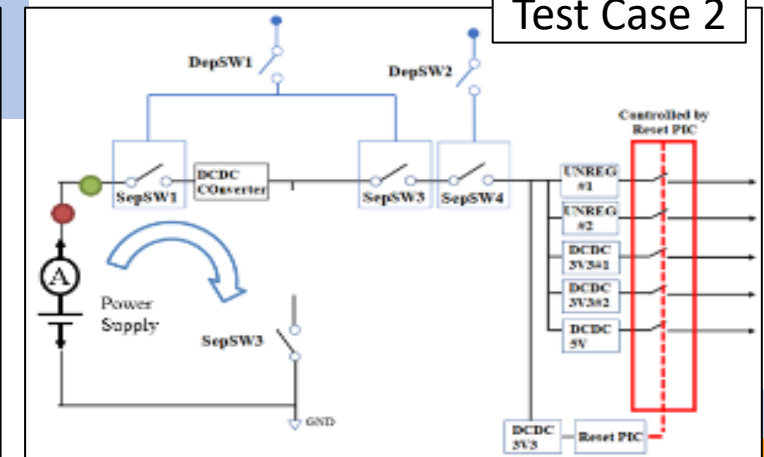


Test setup (Case 2)

Test Case 1



Test Case 2

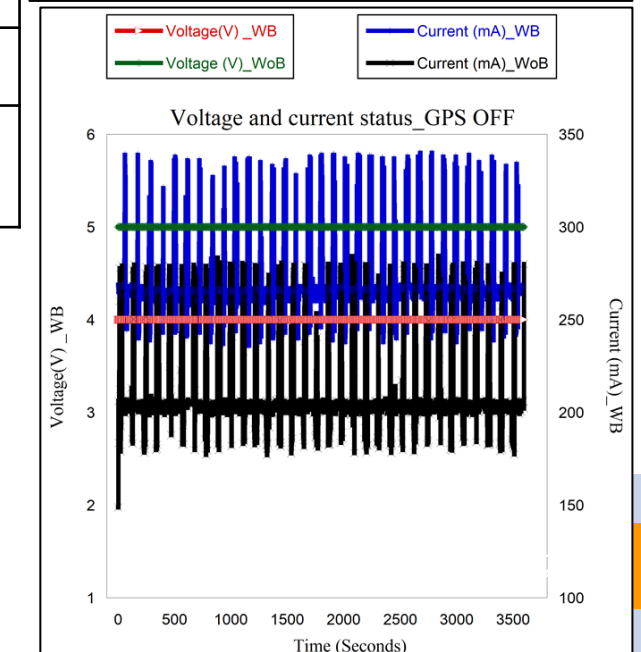
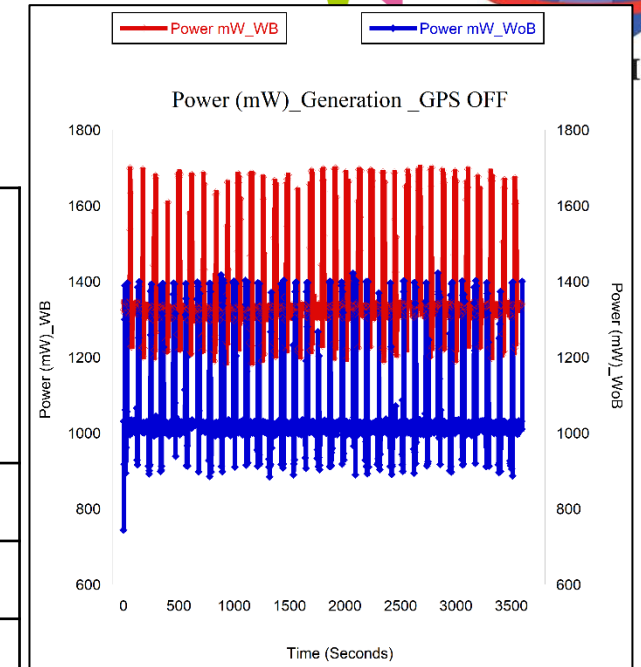


BIRDS-4 EM satellite test result (2/2)



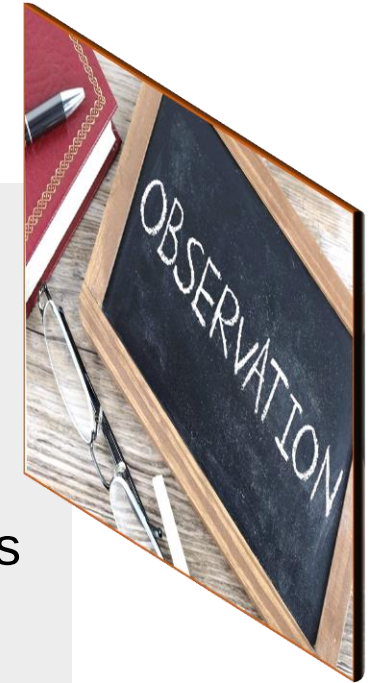
Parameters	Unit	Power Source With Battery Connection (WB) Case-1	Power Source With - out Battery Connection (WoB) Case-2
Generated energy, A	mWh	2039	1578
Blocking diodes loss, B	mWh	360	
BCR efficiency, C	%	80	
Energy loss at battery, D	mWh	210	-
Available Energy to the load, E E = [(A - B)*C] - D	mWh	1133	974

NOTE: - Blocking diode loss (**B**), BCR efficiency (**C**), and energy loss in battery (**D**) are measured and same in page 7



Observation (On-orbit and Ground test)

- For on-orbit at worst case, the available generated energy is 1604 mWh (at 5 solar panels) >>page 7
- And, according to ground test results the available energy 1133 mWh >>page 8
- The results of the on-orbit and ground tests are not exactly equivalent. The battery was fully charged and receiving constant power from an external power source during the ground test setup evaluation. At this test, the battery did not require a lot of power to fully charge. Thus, the power generation was relatively low.



Summary and Conclusion

- Focus on power budget reliability based on flight data rather than simulation. The estimated power generation in one orbit is 2500mWh in one orbit and the available power to the load is 1600mWh for the case of 5 solar panels working (see page 7).
- Estimate the Power Generation from the satellite in the worst-case (Low Beta) ; please follow page no.7
- The nominal power consumption of the satellite per orbit should be around 1000mWh or less, so that the satellite can continue to function even if one solar panel fails; please see the table on page number 7.
- Due to the general flight experiences of the BIRDS-3 and BIRS-4 satellites, there is no need to use a battery heater on the satellite.
- Power generation can vary depending on the satellite's TLE (high or low beta angle), initial orientation, rotation speed, and other parameters.



Acknowledgement

- ❑ Prof. Mengu Cho
- ❑ BIRDS-3, BIRDS-4 and BIRDS-5 members

END OF EPS REPORT



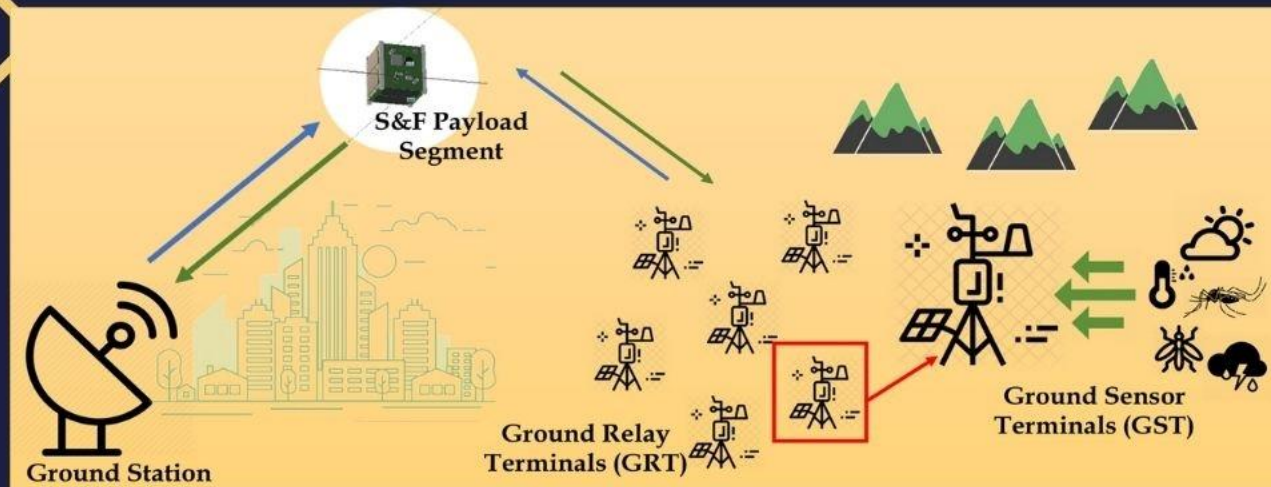
BIRDS-DB

STORE & FORWARD DATABASE

Written by: Mark Angelo C. Purio

STORE & FORWARD MISSION

The increasing interest to use CubeSats for store-and-forward-based (S&F) satellites as remote data collection systems have been demonstrated since 1990s. The S&F technology is a key element to link sensor networks deployed on the ground for specific data collection purposes.



In Kyutech, cube satellites such as the BIRDS satellites and KITSUNE/SPATIUM II has on-board S&F payload which is complimented by ground sensor terminals that collect specific data for its member countries.

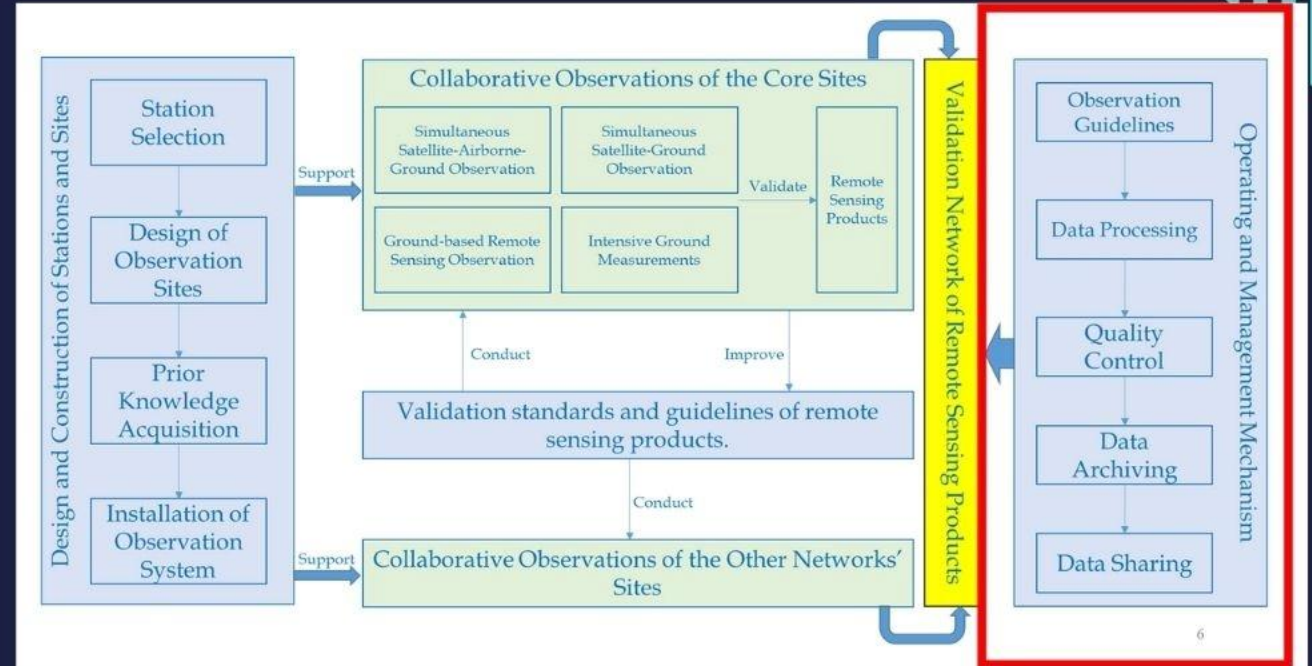
These payloads and ground sensor terminals not only aim to demonstrate technology but also build capacity for participating developing countries.

It is composed of 2 segments such as the space segment which is implemented through a S&F payload while the ground segment is composed of ground receiving stations and ground terminals. Ground terminals may include relay and sensor terminals.

OPERATION & DATA MANAGEMENT MECHANISM FRAMEWORK

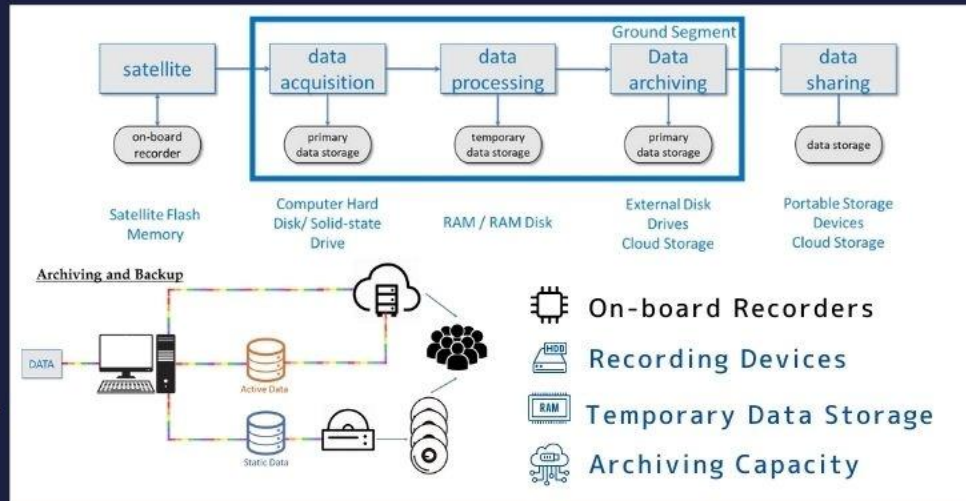
In general, remote data collection involves an operation and data management mechanism framework. As shown, this framework is part of an entire process of data collection, validation, and management.

These mechanisms include in-suit observation guidelines, data processing guidelines, data quality control guidelines, data archiving guidelines, and data sharing regulations.



*M. G. Ma, X. Li, W. Weizhen, Q. Xiao, K. Zhao, and X. P. Xin, "Design on Validation Network of Remote Sensing Products in China," ISPRS - Int. Arch. Photogramm. Remote Sens. Spat. Inf. Sci., vol. XL-2/W1, no. June, pp. 1-6, 2013.

STORAGE MECHANISM FRAMEWORK



*K. Reiniger, "Digital Storage Devices for Photogrammetry and Remote Sensing," Library (Lond)., 1997

In principle the following different storage devices must be regarded:

- onboard recorders for the storage of data sets buffered for a retransmission to dedicated ground stations or users.
- recording devices for the storage of the acquired primary satellite data stream during reception at the ground stations,
- temporary computer storage capacity during data processing, product generation and data evaluation.
- archiving capacity for long-term preservation of historical relevant data sets.

BIRDS-DB: STORE & FORWARD DATABASE

With what was presented in the previous literature, the S&F Mission team of KITSUNE came up with a way to effectively share the store & forward data to its member GST countries. We call it BIRDS-DB: Store & Forward Database.



FRONTEND



BACKEND



DATABASE

**DATA
MANAGEMENT
SYSTEM**

The online platform is designed to collect, store, and organize the S&F data so that it can be distributed to the participating countries.

To achieve this, the following system requirements were established:

- archive the processed data and shall save the data in dedicated storage and
- provide a mechanism to share the data among members of the ground sensor terminal (GST) network

In the development of this data management system, three things were considered: the Frontend, the Backend and the Database

BIRDS-DB: STORE & FORWARD DATABASE



FRONTEND

The frontend refers to the user interface or application that enables accessing tabular, structured, or raw data stored within it. It holds the entire application programming utility for data, requests input and sends it to the database back-end. As shown interfaces such as the login page, signup page, and other pertinent pages were designed.

Satellite Data Management Portal

Username: puryou2714

Password: [masked]

Login

Don't have an account? Sign up
Forgot Password

LOGIN PAGE

Satellite Data Management Portal

First name: [input]

Last name: [input]

Username: [input]

Email: [input]

Country: [dropdown]

Register

Already have an account? Log in

SIGNUP PAGE

BIRDS-DB: STORE & FORWARD DATABASE



FRONTEND

Satellite Data Portal
Satellite Data

Users Satellite Data Upload Data Settings Welcome, Jet

Raw Satellite Data

Filter sat data

ID	DATE/TIME	GST	DATA TYPE	TIME	SENSOR	CHECKSUM
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

Download .txt data

S&F DATA PAGE

Satellite Data Portal
Upload Sat Data File

Users Satellite Data Upload Data Settings Welcome, Jet

Upload Satellite Data Files

Choose file... Browse

File ID	File Name	Packet Format	Upload Date	Uploader	Actions
-	-	-	-	-	 

DATA UPLOAD PAGE

BIRDS-DB: STORE & FORWARD DATABASE



BACKEND

The backend is accessed by users indirectly through an external application rather than by application programming stored within the database itself or by low level manipulation of the data. In the BIRDSDB, the source data, operations, databases, and distribution processes were considered to put together the backend part.



BIRDS-DB: STORE & FORWARD DATABASE



DATABASE

Although the database is part of the backend, it is also imperative to state that we have 2 databases:

The User database which contains user information, user permissions and account settings while the S&F data database contains specified information related to country/GST information, Time Data, Sensor type and the actual sensor data.



USER DATABASE

- User Information
- Country
- User Permissions
- Account Settings



S&F DATA DATABASE

- Country/GST Info
- Time Data
- Sensor Type
- Sensor Data

GST	DATA TYPE	TIME	SENSOR	CHECKSUM
01 01	SC	00 18 A0 01	79 00 A0 A1 21 A2 0 0	05
01 01	SC	00 18 A0 02	79 00 A0 A2 21 A3 0 0	29
01 01	SC	00 18 A0 03	79 00 A0 A3 20 A2 0 0	3F
01 01	SC	00 18 A0 04	79 00 A0 A1 21 A3 0 0	4D
01 01	SC	00 18 A1 02	79 00 A2 A1 25 CA 0 0	06
01 01	SC	00 18 A1 08	79 00 A2 A1 25 CA 0 0	0E
01 01	SC	00 18 A1 1A	79 00 A2 A1 25 CA 0 0	0B
01 01	SC	00 18 A1 27	79 00 A2 A1 25 CA 0 0	09
01 01	SC	00 18 A1 32	79 00 A2 A1 24 CA 0 0	03
01 01	SC	00 18 A1 3F	79 00 A2 A1 24 CA 0 0	0E

BIRDS-DB: STORE & FORWARD DATABASE DATABASE



To also address the concern of user and data access, Role Permissions were established in both user handling and data handling



USER DATABASE

- User Information
- Country
- User Permissions
- Account Settings



S&F DATA DATABASE

- Country/GST Info
- Time Data
- Sensor Type
- Sensor Data

USER ROLE PERMISSIONS

USER HANDLING

- Read
- Create
- Update
- Delete

DATA HANDLING

- Read
- Create
- Update
- Delete

BIRDS-DB: STORE & FORWARD DATABASE



USER ROLE PERMISSIONS

	User Handling				Data Handling			
	Read	Create	Update	Delete	Read	Create	Update	Delete
Super Admin	☒	☒	☒	☒	☒	☒	☒	☒
Admin	☒	☒	☒		☒	☒	☒	
Manager	☒		☒					
Uploader	☒				☒	☒		
User	☒				☒			

BIRDS-DB: STORE & FORWARD DATABASE

Way Forward

- Bug fixes and parsing improvements
- Deployment of the database online
- User enrollment
- User experience test

END OF THE BIRDS-DB REPORT

Contributing teams:

Adamson University
Kyushu Institute of Technology
KITSUNE/SPATIUM II
S&F Mission & GST
BIRDS Network

09. FAQs for JR rail passes



Cart: (Empty)

English (US) ▼

| How To Use | Discover Japan (Blog) | Japan Travel Tips | FAQ | About Us |

Home

JR Pass

Regional Passes

Tour Packages

Services

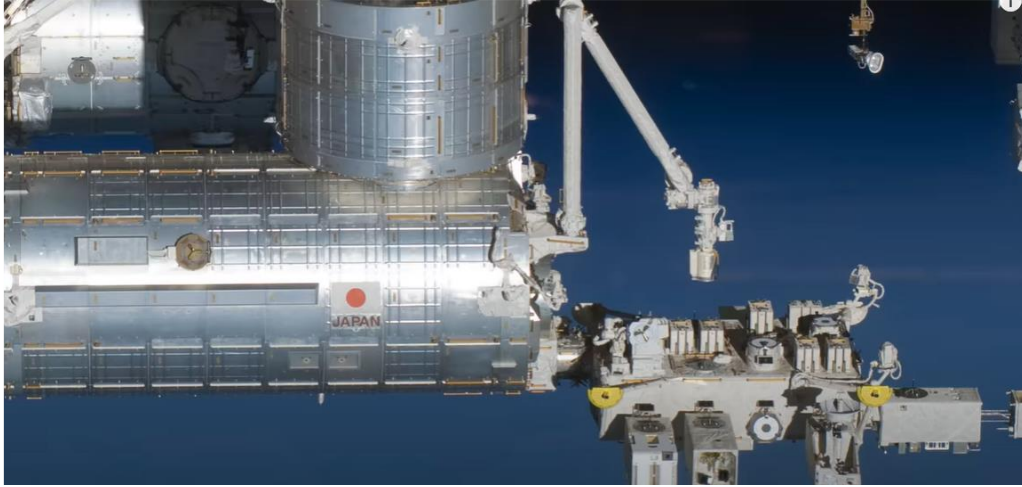
Search

FAQ

1. What is a Japan Rail Pass?
2. Am I eligible to use the Japan Rail Pass?
3. What personal information is needed to purchase the Japan Rail Pass?
4. What is a "Green Car" vs an "Ordinary Car"?
5. Do you sell other types of Japan Rail Passes?
6. Can I use the Japan Rail Pass to board any train, bus, or ferries in Japan?
7. Should I get the Japan Rail Pass now? Will the Japan Rail Pass expire?
8. How do I purchase and use the Japan Rail Pass?
9. How do I book reserved seating?
10. Can you book seat reservation for me?
11. Are there any porters or lockers at the stations?
12. What is the refund policy?
13. What happens if my Exchange Order or Japan Rail Pass is lost or stolen?
14. Is the Japan Rail Pass really a good deal?
15. What size luggage can I take on a Bullet Train (Shinkansen)?

GET THE ANSWERS HERE: <https://www.myjypass.com/en/cms/faq#q2>

10. Outstanding review of rocketry history in Japan, by Scott Manley



Above: Japan's ISS module.

Below: Japan's cargo ferry for the ISS



How Japan Managed To Launch Rockets Into Orbit Without Steering

<https://www.youtube.com/watch?v=UZals6oSlOI>

Apr 5, 2022

by **Scott Manley**

Japan was the 4th country to launch a satellite into orbit using their own launch vehicle and they managed to do this despite not being able to use any guidance systems on their early rockets because of legal prohibitions on weapons development which included long range rockets. This meant using a clever launch system that placed the rocket at the correct angle to begin a gravity turn to take them to space.

JAXA's story on the Pencil rocket development

<https://global.jaxa.jp/article/interv...>

Jonathan McDowell's paper on the Kappa and Lambda sounding rockets.

<https://www.planet4589.org/space/pape...>

JAXA's own site on these launch vehicles.

<https://www.isas.jaxa.jp/en/missions/...>

Open Aerospace details about Lambda 4s

<https://open-aerospace.github.io/Lamb...>

Norbert Brugge's Spaceroockets site on Japan's launch vehicles.

http://www.b14643.de/Spaceroockets_1/J...

My own video on the SS-520 from a few years ago

<https://youtu.be/jBUFNgLrykc>

Follow me on Twitter for more updates:

<https://twitter.com/DJSnM>



https://www.isas.jaxa.jp/e/japan_s_history/detail/kappa.shtml

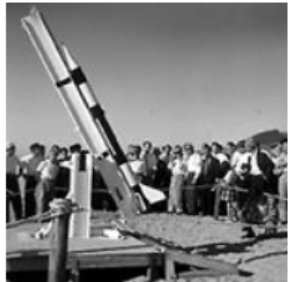
Under the Limelight ---- The Kappa Era

The minimum altitude required to join IGY was supposed to be 60-100 km. The sounding rocket team at the University of Tokyo continued to launch and improve Baby rockets to accumulate basic data to attain the required altitude.

The AVSA group had originally planned to go through A (Alpha), B (Beta), K (Kappa), and Ω (Omega) extending the scale one after another and to launch 20 kg instruments up to 100 km altitude. To join IGY, however, the group happened to have to speed up the pace of research and development. Thus the group proceeded directly to Kappa type neglecting the intermediate stages.

Double Base Kappa

The first three K-series, K-1, K-2 and K-3, adopted the double-base propellant of the Baby series. K-1, 128 mm in diameter, had an initial acceleration of 25 G and thundered away at the instant of ignition. K-3 was the first two-stage Kappa. Double-base propellant cannot be cast into a chosen shape of a large size (1 cm diameter is the upper limit). When the double-base is to be crammed into a large motor case, many units of double-base propellant had to be packed inside, like umbrellas in an umbrella stand.



K-6 --- Adoption of Composite Propellant



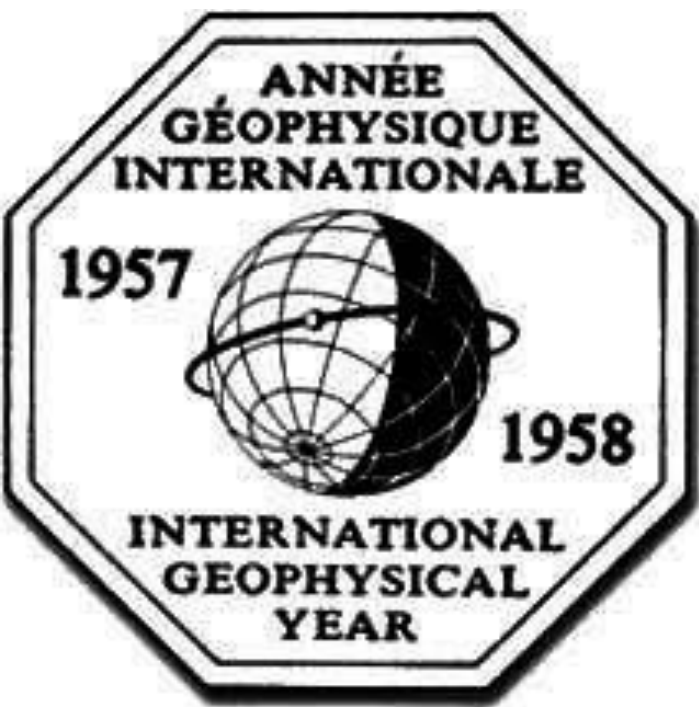
Composite-type propellant, on the other hand, could be controlled in its shape, and enabled a lightweight motor case utilizing internal burning. Thus K-4, K-5 and K-6 employed composite propellant (polyester-type). But the development of this type of propellant did not always meet a favorable wind. For example, in its initial developmental stage, explosion followed ignition every time. When a dealer of apparatus and materials for the experiments visited the laboratory with his bill, all the staff often just stood there with their mouths open in utter amazement, surrounded by

fragments of motor case and propellant.

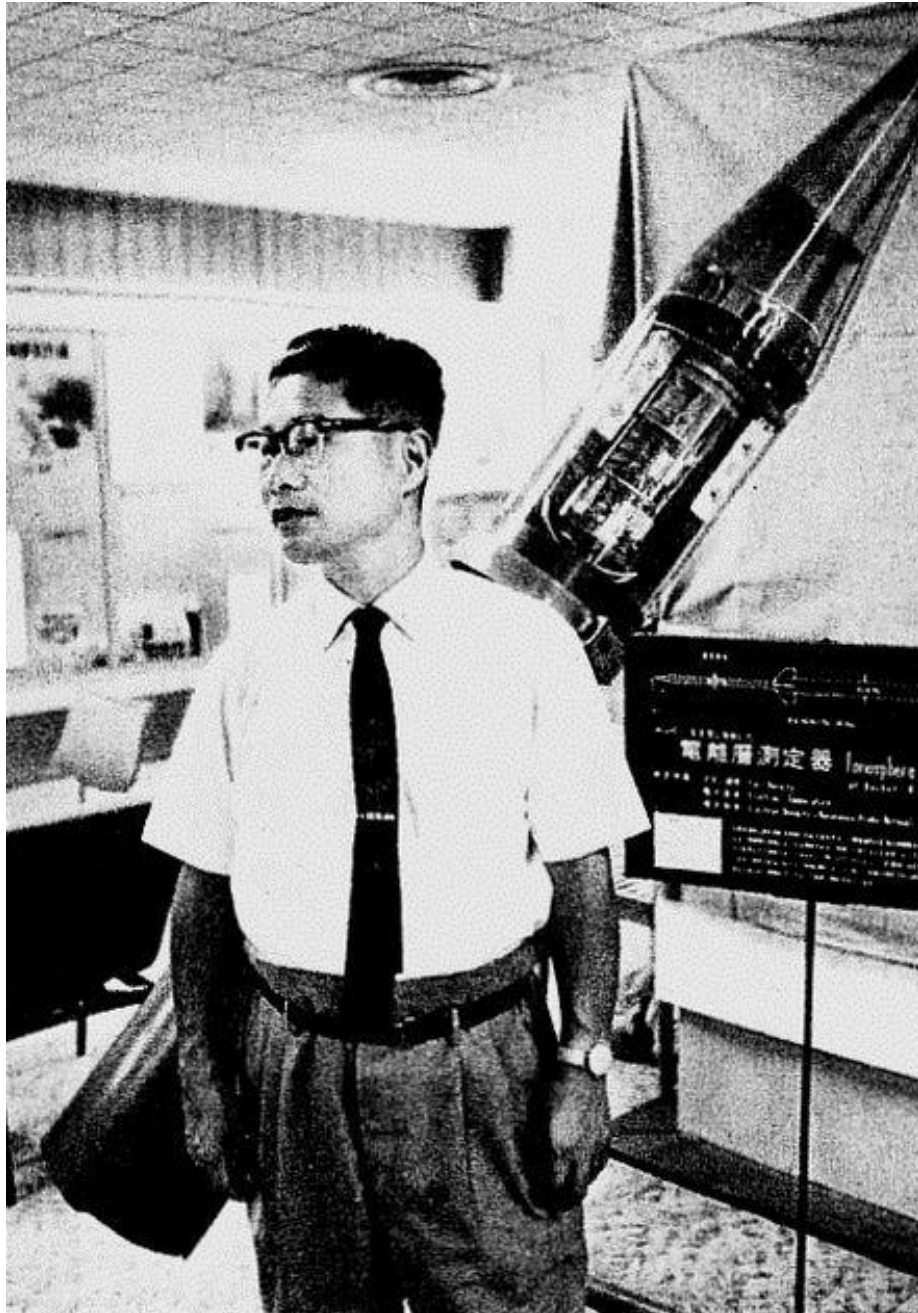
According to Scott Manley, Japan very much wanted to contribute a useful sounding rocket to IGY. That rocket became Kappa-6 (K-6) – shown at the lower left.



IGY commemorative stamp issued in Japan (10-yen stamp)



国際地球観測年 (こくさいちきゅうかんそくねん、英語: International Geophysical Year、略称: **IGY**) は、1957年7月1日から1958年12月31日まで続いた、国際科学研究プロジェクトの名称。国際年の第1号として数えられる。当初は太陽の磁気が地球に与える影響を研究するために設定された。



← Hideo Itokawa (1961)

Born	July 20, 1912; Tokyo
Died	February 21, 1999 (aged 86)
Nationality	Japanese
Education	Tokyo Imperial University
Known for	

“The father of Japanese space development”

Scientific career

Fields	Rocketry
Institutions	Imperial University of Tokyo

Born in Tokyo, Itokawa skipped grades in school and graduated from the Tokyo Imperial University in 1935, having majored in aeronautical engineering. In 1941, he became an assistant professor of the Imperial University of Tokyo. During World War II, he was involved in designing aircraft at the Nakajima Aircraft Company and designed the Nakajima Ki-43 Hayabusa ("Peregrine Falcon"; Allied reporting name "Oscar") fighter.

Itokawa became a full professor in 1948. In 1955 Itokawa worked on the Pencil Rocket for Japan's space program. He retired from his post at the university in 1967 and established an institute.

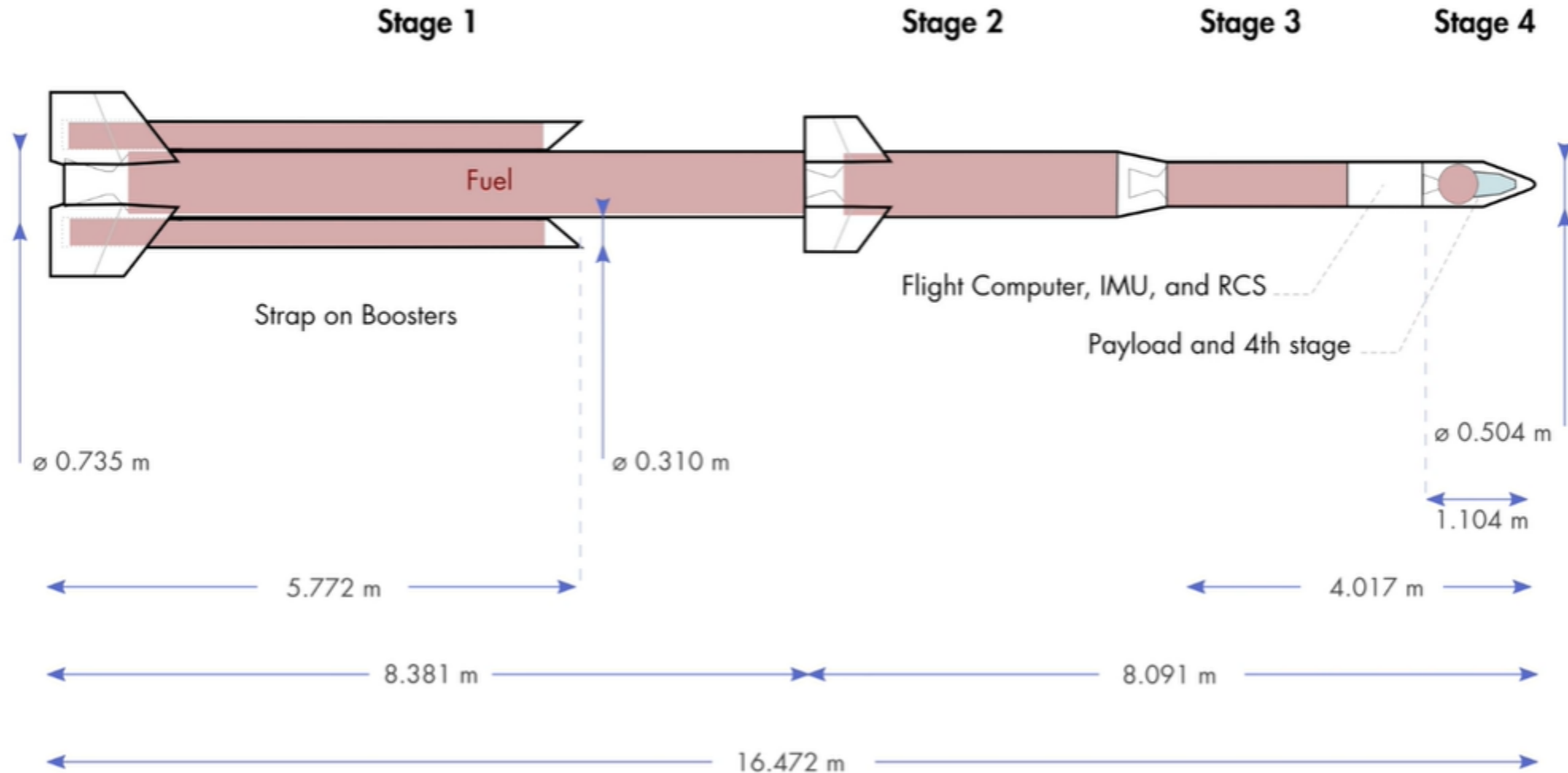
Itokawa wrote 49 books, and was a best-selling author. Topics that Itokawa became interested in or took as a hobby, include such sports as basketball, golf and swimming, as well as orchestral arrangements and such instruments as cello, harmonica, organ, piano, violin and taishōgoto (a string instrument invented in Japan). He was also interested in baton twirling, brain waves, English plays, Mah Jong, philosophy, rocket engineering and novel writing.

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

Lambda-4S-5 Outline

This link is clickable

<https://open-aerospace.github.io/Lambda-4S/>





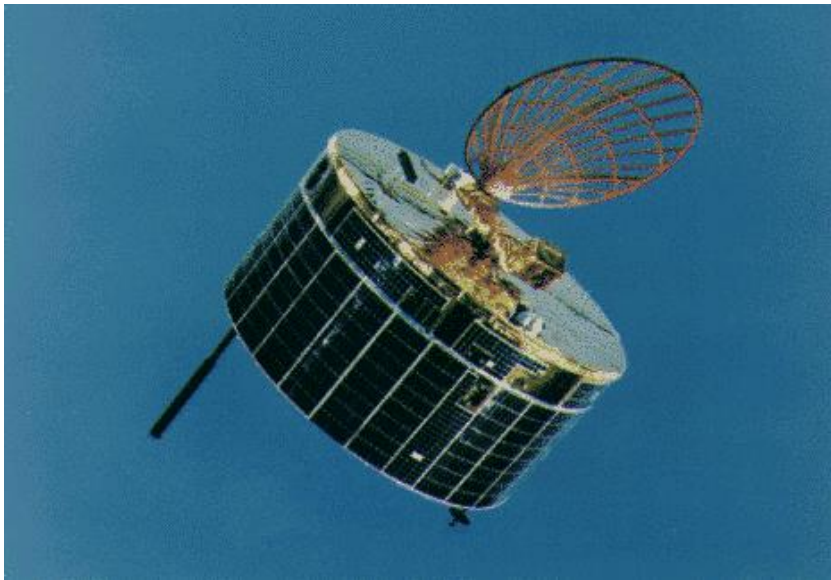
The Lambda 4S or L-4S was an experimental Japanese expendable carrier rocket. It was produced by Nissan and the *Institute of Space and Astronautical Science* and launched five times between 1966 and 1970 with Ohsumi technology demonstration satellites. The first four launches failed, however the fifth, launched on 11 February 1970, successfully placed Ohsumi-5 (*shown at the right*), the first Japanese satellite, into orbit.

https://en.wikipedia.org/wiki/Lambda_4S



Ohsumi-5

[https://en.wikipedia.org/wiki/Ohsumi_\(satellite\)](https://en.wikipedia.org/wiki/Ohsumi_(satellite))



SAKIGAKE SPACECRAFT Sakigake—translating to "pioneer" or "Pathfinder", known before launch as MS-T5, was Japan's first interplanetary spacecraft, *and the first deep space probe to be launched by any country other than the USA or the Soviet Union.*

Sakigake was developed by the Institute of Space and Astronautical Science for the National Space Development Agency (both of which are now part of the Japanese Aerospace Exploration Agency, or JAXA). It became a part of the Halley Armada together with Suisei, the Soviet/French Vega probes, the ESA Giotto and the NASA International Cometary Explorer, to explore Halley's Comet *during its 1986 sojourn through the inner solar system.*

Name (pre-launch in parentheses) **TANSEI (MS-T1)**

Objectives Performance verification of M-4S rocket and, after insertion into orbit, research on space environment and satellite performance test.

Launch Date 13:00, February 16, 1971 (JST)

Launch Location Kagoshima Space Center (Uchinoura)

Launch Vehicle M-4S-2

Weight 63kg

Orbital Altitude Perigee 990 km, Apogee 1,100 km

Orbital Inclination 30°

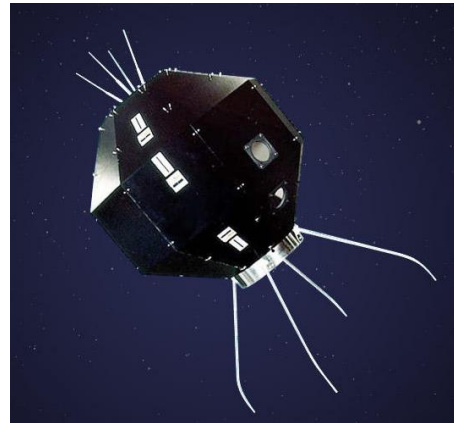
Orbital Period 106 min

Scientific Instruments

- Command receiver and decoder
- Magnetic tape-type data recorder, etc.
- Installed 6-reflection mirror on the satellite surface
- Carrying silver oxide–zinc battery as power supply

End of Operation February 23, 1971

Operation The signal of the first rotation after launch was received from 14:50:40 to 15:09:12, confirming that the satellite had entered into orbit. Thereafter, observation at Uchinoura continued until 15:00 on February 23 (96 rotations). During the period, all the onboard instruments, except for an instrument to check solar-battery performance, functioned normally. By replaying the data recorder 37 times, abundant data were retrieved including temperature of various parts of the satellite, power-supply voltage and current, satellite altitude and spin status, etc. Tests for telemetry and command systems were performed without problems. After analysis, it was confirmed that temperature and environment inside the satellite were properly maintained as expected and the attitude of the satellite was stable.



[TANSEI | Spacecraft | ISAS \(jaxa.jp\)](http://www.isas.jaxa.jp/tansei/)



About Epsilon Launch Vehicle

The Epsilon Launch Vehicle is a solid-fuel rocket designed to lower the threshold to space hitherto regarded as “special” and usher in an age in which everyone can make active use of space. Under the banner of “the world’s most compact launch”, JAXA has sought to streamline assembly, inspection and other operations and to renovate the entire launch system, spanning operations, equipment and airframes. Ingenious approaches have been taken to reduce vibration and noise as well as to buffer shocks during satellite separation from the rocket in order to achieve a world-class ride. Four Epsilon Launch Vehicles have been launched from the **Uchinoura Space Center**, all successfully.

<https://global.jaxa.jp/projects/rockets/epsilon/>



SS-520

The SS-520 is a two-stage rocket, the first stage of which comes from the main booster of the S-520, and has a capability for launching a 140 kg payload to an altitude of about 800 km. The SS-520 aims at reaching 800 km altitude, and at the same time, carrying out technological experiments concerning the development of a mini-satellite launch vehicle by adding the third stage atop. The first stage is stabilized aerodynamically by use of tail fins like the S-520. As the second stage is heavier than the head of S-520, the aerodynamic margin is secured more than ever. The whole motor case of the second stage is made of CFRP. The spin generated in the first stage is succeeded by the second stage, and it is utilized in the Rhumb-line control and spin stabilization.

The SS-520 debuted in January, 1998, and ISAS has a plan to launch it from Spitsbergen, Norway, to send a payload into the cusp region of the geomagnetosphere.

https://global.jaxa.jp/projects/rockets/s_rockets/

11. SEIC Guest Lecture: In-person lecture by Garvey McIntosh (NASA Attache@US_Embassy_Tokyo)



Arrival at Kokura Station
11:30 AM, 25 April



Curry
定食



Lunch at this
Kokura Indian
restaurant

←Garvey puts
finishing touches
on his SEIC
presentation





**Outstanding lecture
hall (*PBL Laboratory*
of Tobata Campus)**

The opening slide



The title of his talk:
U.S./Japan collaboration in space exploration: the most important partnership in the world today





**Thank you
Garvey!!!!**



**The talk was during
14:40-16:00.
Afterwards, I took him
to Hakata Station on
the Shinkansen. He
had another
engagement in
Fukuoka City.**

25 April 2022 @ PBL Laboratory of Tobata Campus, Kyutech

Photo credit: T. Fuse



Self-introduction

By : Hanadi Abdalla
24/04/2022

Editor's note: Hanadi comes to Kyutech
on a JTI scholarship – a first for SEIC.

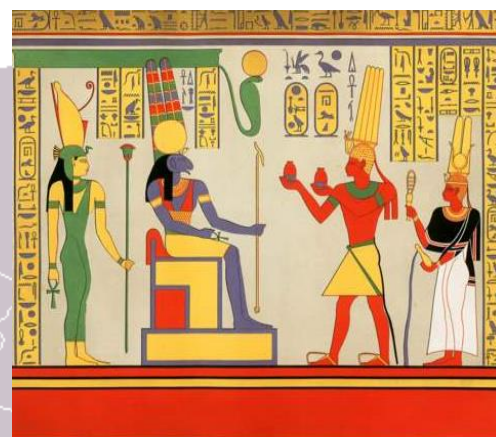


Who I am

- Name: Hanadi Mohamed Mirghani Abdalla
- Country: Sudan
- Birthdate: 13 February
- Major in college: Electrical and Electronics Engineering- University of Khartoum.
- Experience: Research Assistant , Software engineer.
- Others:
 - SGAC member, Scholarships team
 - Hobbies: sewing, crocheting, swimming
 - Leisure activities: Watching movies, learning new languages.
- I am currently a research student at Cho laboratory and will be starting my masters degree (SEIC) studies in October, 2022.



Where I come from





**End of
Hanadi's
self intro**

UPDATES FROM THE PHILIPPINES



Philippine
Space
Agency

STAMINA4SPACE

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

Funded by:



Monitored by:



Implemented by:



APRIL 2022

The PhilSA ACCESS Nanosat Project

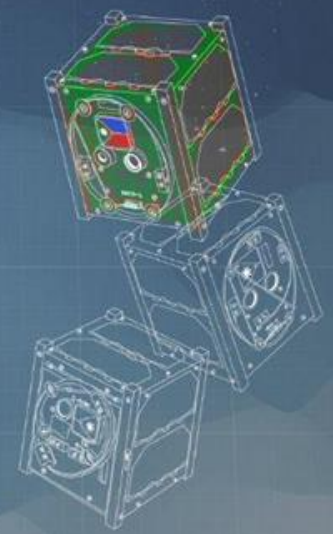
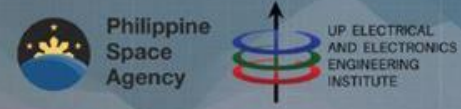
ACCESS

Advancing Core Competencies and Expertise in Space Studies
Nanosat Project

The PhilSA ACCESS Nanosat Project offers an opportunity to design and develop a CubeSat under the nanosat engineering track of the Master of Science (MS) or Master of Engineering in Electrical Engineering (MEng EE) programs of the University of the Philippines Electrical and Electronics Engineering Institute (UP EEI).

Deadline for applications is on 06 May 2022

Shortlisted applicants will also be eligible to apply for the PhilSA AD ASTRA Scholarships



The University of the Philippines Electrical and Electronics Engineering Institute (UP EEI) has been building expertise and proliferating know-how in nanosatellites in the Philippines through the Space Science and Technology Proliferation through University Partnerships (STeP-UP) Project under the STAMINA4Space Program funded by the Department of Science and Technology (DOST), and supported by the Science Education Institute (DOST-SEI). The program successfully launched the first locally developed CubeSats, Maya-3 and Maya-4, and will soon send Maya-5 and Maya-6 into orbit. PhilSA is set to continue the country's nanosatellite research, development and educational initiatives through the Advancing Core Competencies and Expertise in Space Studies (ACCESS) Nanosat Project. The initiative is seen to provide broader access to space education and opportunities.

<https://philsa.gov.ph/news/the-philsa-access-nanosat-project>

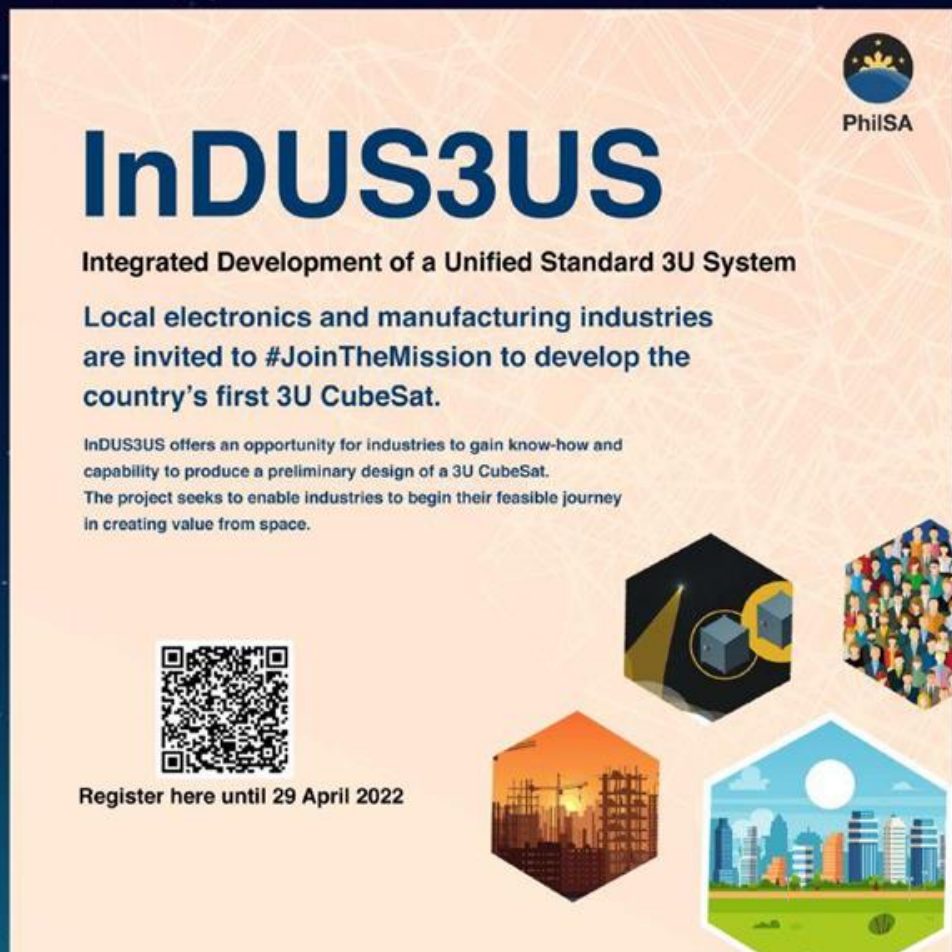


Philippine Space Agency

PREPARED BY:

Public Relations and Information Division
Philippine Space Agency

PhilSA launches InDUS3US



InDUS3US

Integrated Development of a Unified Standard 3U System

Local electronics and manufacturing industries are invited to #JoinTheMission to develop the country's first 3U CubeSat.

InDUS3US offers an opportunity for industries to gain know-how and capability to produce a preliminary design of a 3U CubeSat. The project seeks to enable industries to begin their feasible journey in creating value from space.

Register here until 29 April 2022

PhilSA

The poster features a QR code and four hexagonal icons: a satellite, a group of people, a city skyline, and a landscape with a sun.

In line with its goal to enhance the local upstream space technology sector, the Philippine Space Agency (PhilSA) launched its project InDUS3US or Integrated Development of a Unified Standard 3U System.

Under the project, PhilSA's Space Technology Missions and Systems Bureau (STMSB) will engage with industry partners to complete a 3U CubeSat up to preliminary design review (PDR) level, guided by the Agency's Safety and Mission Assurance (S&MA) Standards.

Selected partners will undergo an 8-month training facilitated by PhilSA's satellite engineers, which will include a systems engineering crash course, mentorship and training on satellite development and testing, and continued collaboration with institutional partners.

<https://philsa.gov.ph/news/indus3us-open-call/>



PREPARED BY:

Mae Ericka Jean C. Picar

Information Officer, STeP-UP Project
STAMINA4Space
Overall Graphics/Layout Artist and
Contributing Writer

Katrina Mina

Information Officer, GRASPED Project
STAMINA4Space
Contributing Writer/ Overall Editor

F. Mara Mendoza

Project Manager, STeP-UP Project
STAMINA4Space
Contributing Writer/ Overall Editor

6 YEARS

since Diwata-1 was deployed to space

On April 27, 2016 the Diwata-1 microsatellite was deployed into space to start its mission to be the Philippines' own "eye in the sky."

It was deployed from the Japanese Experiment Module (JEM), nicknamed "Kibo," onboard the International Space Station (ISS). The JEM Small Satellite Orbital Deployer released it at an altitude of 400 kilometers above the Earth's surface at 7:45 pm Philippine time.



Photo courtesy of JAXA/NASA

Philippine Space
Agency

STAMINA4Space
Program

STeP-UP Scholars
Batch 1

STeP-UP Scholars
Batch 2

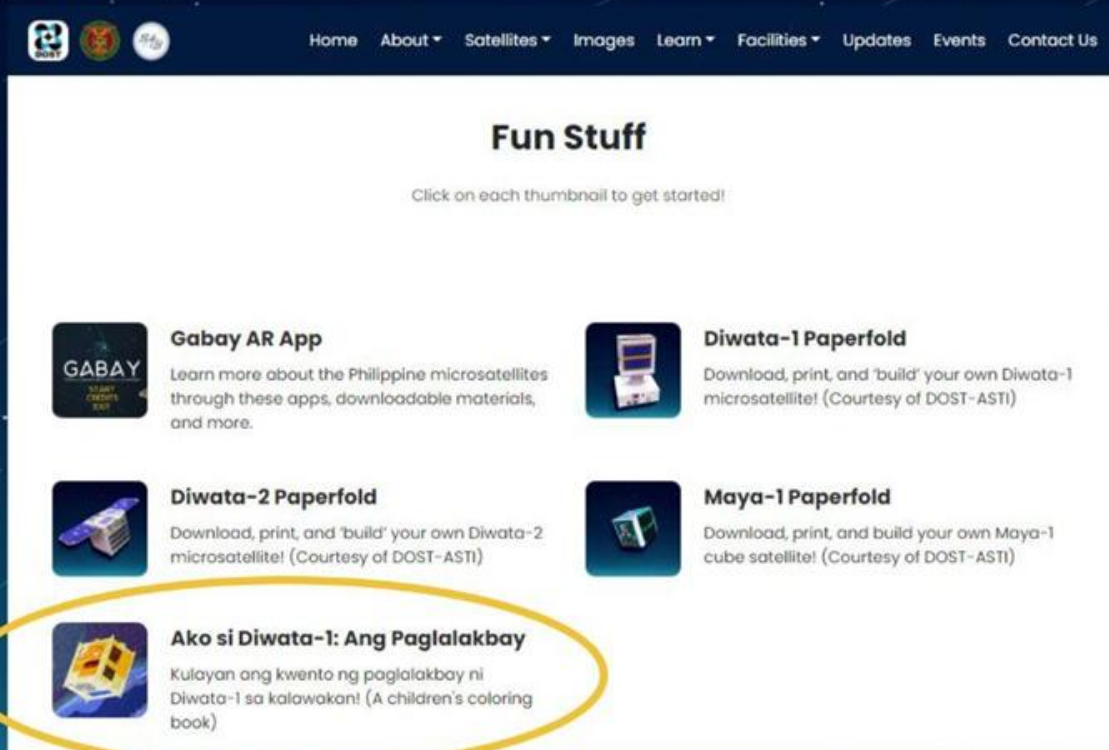
D
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Cheers,
Diwata-1!

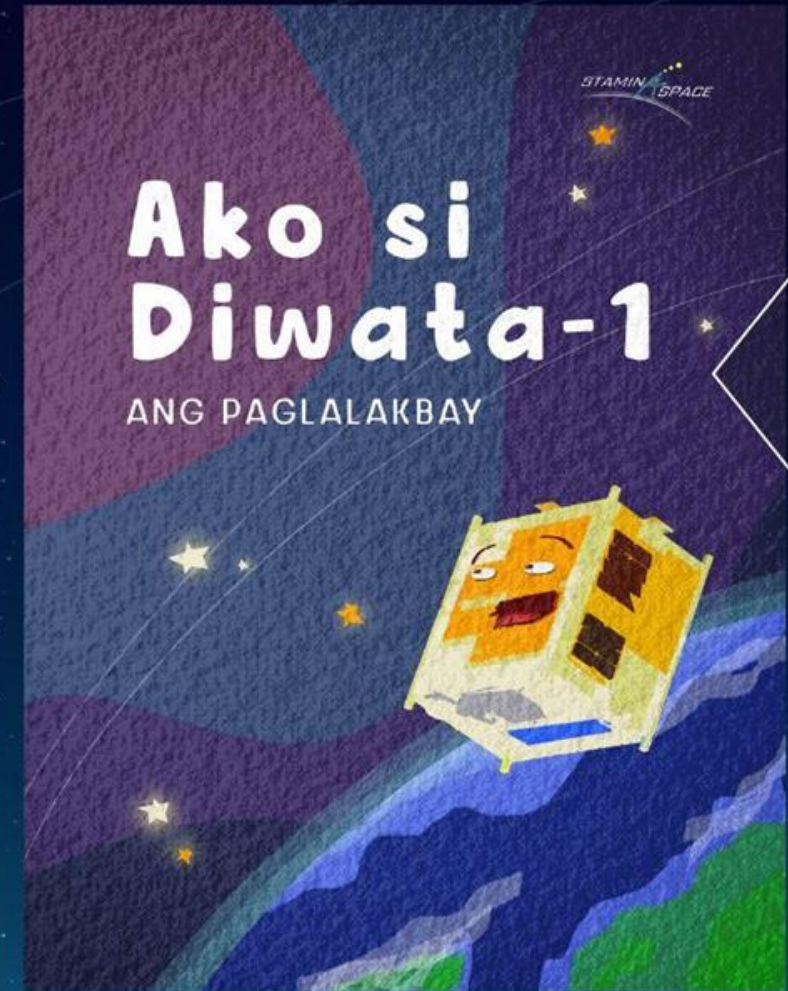
April 7, 2022

To commemorate 2 years after Diwata-1's end of mission, we created a children's coloring book of Diwata-1's adventures!

You can check STAMINA4Space learn page and click on :
<https://stamina4space.upd.edu.ph/interactive-learning-tools/>



Click here!



I am Diwata-1:
THE ADVENTURE

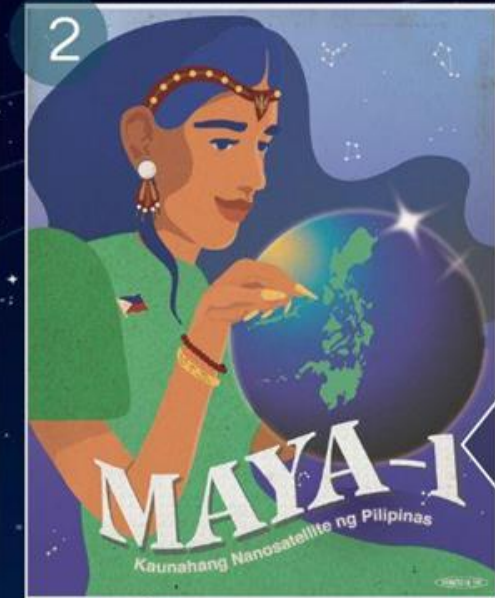
Draw your own Philippine Satellite Character

Here are the five(5) chosen artworks for the "Draw your own Philippine Satellite Character" contest that we posted last February 2022 for National Arts Month.

**Artworks are in no particular order*

See details of the artworks below:

1. Title: "Amihan - Diwata-2 Microsat"
Artwork by: Cyrill Acuña
2. Title: "Have you ever seen a Filipino Heavenly Body?"
Artwork by: contextofyou
3. Title: "Pilipinong Kagalingan, Abot Hanggang Kalawakan"
Artwork by: Maria Angelina F. Musa
4. Title: "Maria Kalawakan"
Artwork by: Keidee-chan
5. Title: "Curious Duo"
Artwork by: Charles "AnarkyInk" Llanto



Philippine Space Agency

STAMINA4Space Program

STEP-UP Scholars Batch 1

STEP-UP Scholars Batch 2



PREPARED BY:

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Macaraeg**
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Gio Asher Tagabi
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Contributing Writers

WELCOME HOME, MAYA-6!



After the space environment tests performed on the engineering model (EM) of Maya-6 in Kyutech, the cubesat is finally home again! The batch 2 scholars performed some functionality tests on the unit to check if anything got damaged during shipment. Afterwhich, we celebrated with a pizza treat by kuya Jim!

HAPPY BIRTHDAY, VAL!

The team wishes our Aries baby a happy happy birthday! Val celebrated her birthday last March 26 dining and dancing with family and friends.



END OF REPORT FROM THE PHILIPPINES

Philippine Space
Agency

STAMINA4Space
Program

STEP-UP Scholars
Batch 1

STEP-UP Scholars
Batch 2

14. PNST students who begin at Kyutech in Oct 2022

Name	Nationality	D or M	Sex	Age	Current Affiliation	Position
SARA Ramadan Aziz Ghaleb	Egyptian	D	Female	29	National Authority for Remote Sensing and Space Science	Research Assistant
ESIT、 Mehmet	Turkish	D	Male	25	Istanbul Technical University	Research and Teaching Assistant
Jorge Ruben Casir Ricano	Mexico	D	Male	26	Bauman Moscow State Technical University	Aerospace Engineer
Ochirsukh Enkhmend	Mongolia	M	Female	21	National University of Mongolia	B4 student
Fielding Ezra	South African	M	Male	22	University of the Western Cape	Student
KOSIYAKUL Merisa	Thai	M	Female	27	National Astronomical Research Institute of Thailand (NARIT)	Thermal engineer

UNOOSA said they are happy about “*half men and half women*” being achieved.



UNITED NATIONS
Office for Outer Space Affairs

15. Recent arrival of SEIC students (who could not get in due to COVID restrictions)



Pema,
Bhutan,
Fukuoka Airport,
3 May 2022



Miguel (Mika),
Spain,
Kyutech,
28 April 2022



Kan,
Thailand,
Kyutech,
28 April 2022



Hanadi,
Sudan,
Kyutech,
19 April 2022



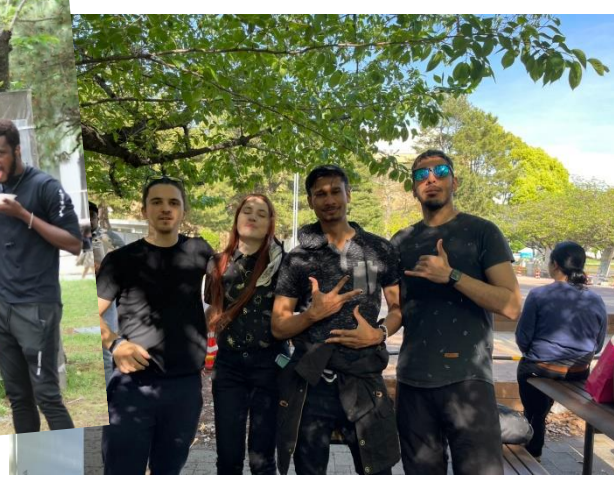
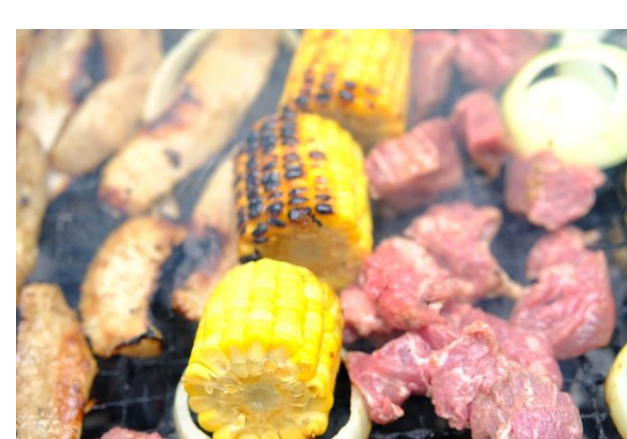
16. Celebrating the arrival of some new SEIC students with a BBQ party



On Sunday (24 April 2022) SEIC assembled for a barbeque.

As you can see with this photo, we enjoyed a great turnout of students and staff. For example, at the far right is Leticia, PNST fellow from Brazil.

Photo credit: Mark Purio





Smile for
Uncle Mark!





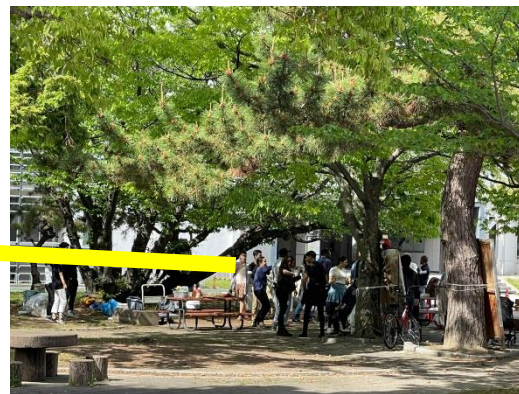


Great salad
by Aekjira
(Thailand)→

Below:
かんぱい



Victor
(Zimbabwe)
leads a dance
with
earth-shaking
music





*Let's
dance!*



**End of SEIC
BBQ photos**

17. Spring Kick-Off Session of Cho Lab (12 April 2022)



Cho Lab Staff



- | | |
|---------------|-----------------|
| ① Dr Masui | ⑧ Dr Ofosu |
| ② Dr Kim | ⑨ Shirakawa san |
| ③ Dr Yamauchi | ⑩ G. Maeda |
| ④ Kawano san | ⑪ Yotsui san |
| ⑤ Fuse san | ⑫ Dr Victor |
| ⑥ Ono san | ⑬ Dr Necmi |
| ⑦ Dr Rodrigo | |



All students and all staff

This photo was taken by Dr Masui from the second floor

18. Polimey (Cambodia) reviews 4 months of Kyutech life

4 months at Kyutech

My life in Kita-Kyushu



Enjoy Hanami with Maeda Sensei and other students



My pictures at Kyutech



4 months at Kyutech

Life in Kita-Kyushu

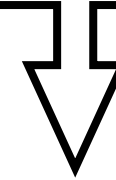
At the first week of March, there are started spring season in Japan. Most people enjoy the cherry blossom.

I have visited Central park in Kita-Kyushu and Kokura castle.

Kokura castle



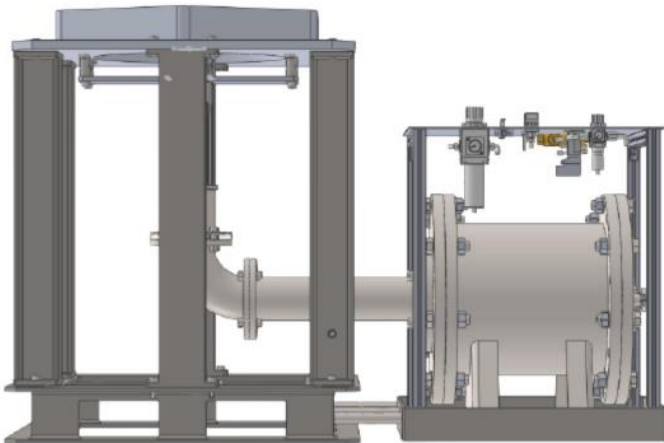
Central Park



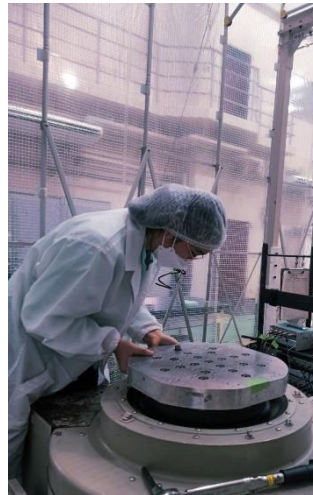
4 months at Kyutech

My research theme

- My research is related with Shock testing.
- I also joined Kyutech CubeSat project called *Leopard* project. I'm in charge with Structural subsystem.
- I have been Kyutech over 3 months. During this 3 months, I have learnt how to conduct Shock and Vibration testing in *Center for Nanosatellite Testing*.



Shock testing Machine



← I have attached the jig on the vibration machine.



Attachment of sensors



G S T V I R T U A L W O R K S H O P 2 0 2 2

1 7 ^{T H} A P R I L 2 0 2 2
P O O J A L E P C H A

GST Workshop Highlights

The 2nd Virtual GST Workshop was held on 10th March 2022 via ZOOM. Although it was initially planned to be an ‘in person’ workshop, it was eventually made to be online due to Corona Virus restrictions. The agenda of the workshop is detailed below:

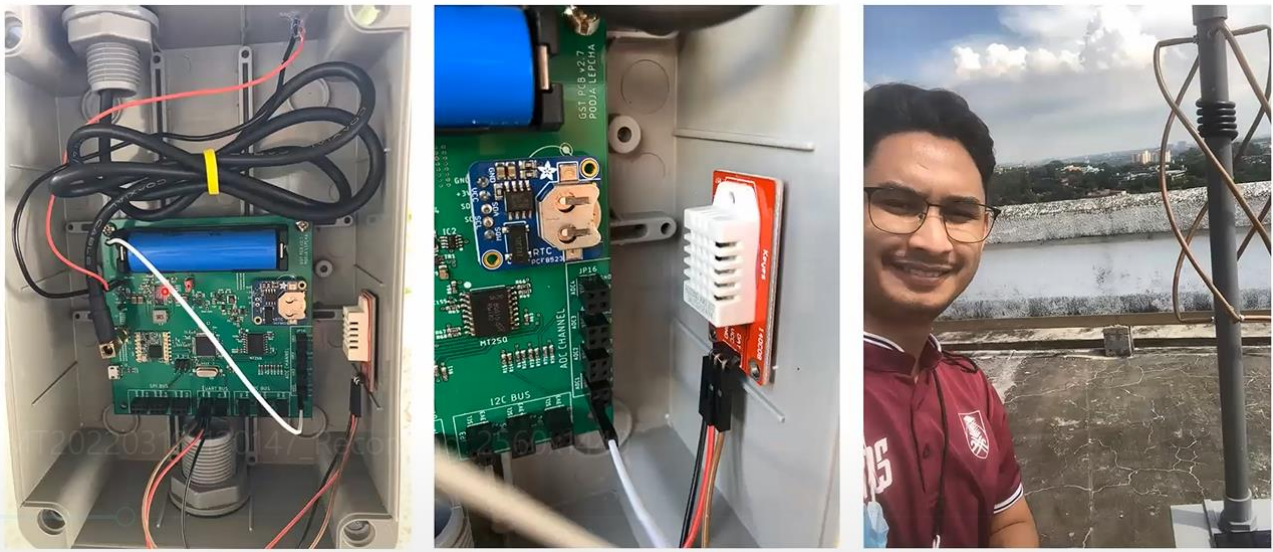
GST Workshop (Virtual) 21:00 - of 10 March 2022 Moderator: Pooja Lepcha				
	Time	Presenter	Name	Contents
1	21:00-21:05	Kyutech	Prof. Cho	Opening remarks
2	21:05 -21:15	Kyutech	Pooja	Update on GST and KITSUNE
3	21:15-21:25	Malaysia	Nik Amirul Aiman Bin Rahmat	Update on the GST development
4	21:25-21:35	Taiwan	Yu Sheng Liu	Update on the GST development
5	21:35-21:45	Philippines	Jeric G. Brioso	Update on the GST development
6	21:45-21:55	Sri Lanka	Tharindu Lakmal Dayarathna	Update on the GST development
7	21:55-22:05	Paraguay	Luis Miranda	Update on the GST development
8	22:05-22:15	Mongolia	Barsbold Bayansan	Update on the GST development
9	22:15-22:25	Nepal	Sirash Sayanju	Update on the GST development
10	22:25-22:35	Kyutech	Mark Angelo Purio	Store and Forward database management

11	22:45-22:55	Kyutech (BIRDS-4)	Adolfo Jara	Operation Updates from BIRDS-4
12	22:55-23:05	Kyutech (BIRDS-5)	Victor Mukungunugwa	Updates and Announcements from BIRDS-5
13	23:05-23:15	Zimbabwe	Tungamirai V. Zvenamo	Update on the GST and Ground Station
14	23:15-23:25	Uganda	Herbert Abigaba	Update on the GST and Ground Station
15	23:25-23:40	ALL	ALL	Discussions and Way Forward
15	23:40-23:50	Kyutech	Pooja	Award Ceremony for BIRDS-3 competition
16	23:50-23:00	ALL	Photo session	Photo Session

The first half was about GST development update and the second half was about ground stations.

Updates from GST Network Countries

From Malaysia – Nik Amirul



Status – Ready for deployment

From Taiwan – Sam Yu-Sheng Liu



Ground Sensor Terminal in Taiwan	
Parameter	
Sensor	NEO-6M GPS Module
Data	Date ,Time ,Altitude Latitude, Longitude (5 types,32 packet)
Period	1 data/min (10s sending data)
Power	0.36 w
Battery	2 solar panels + 2 cells (3 days without sun)

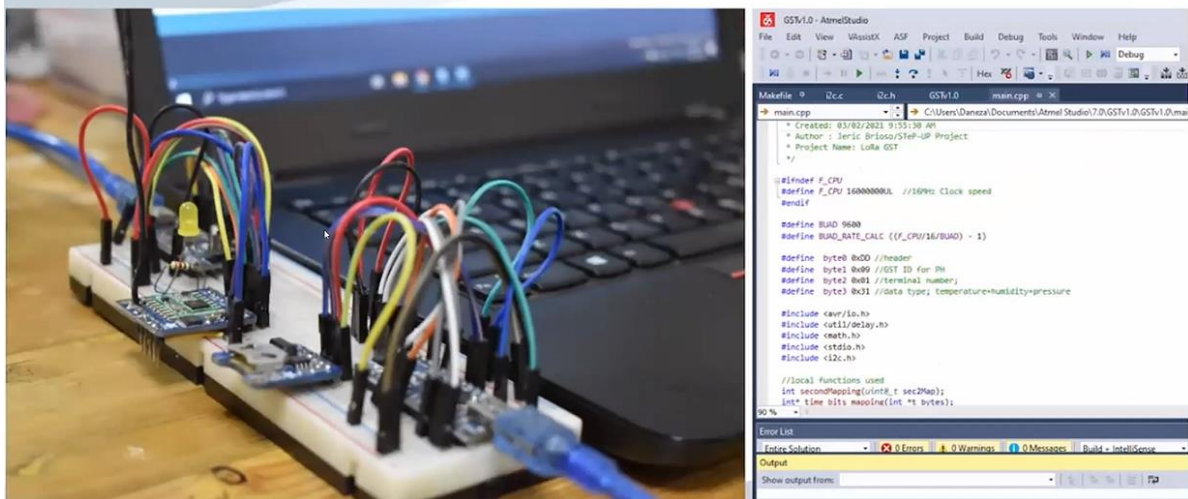
Status – Ready for deployment

Updates from GST Network Countries

From Malaysia – Jeric Brioso

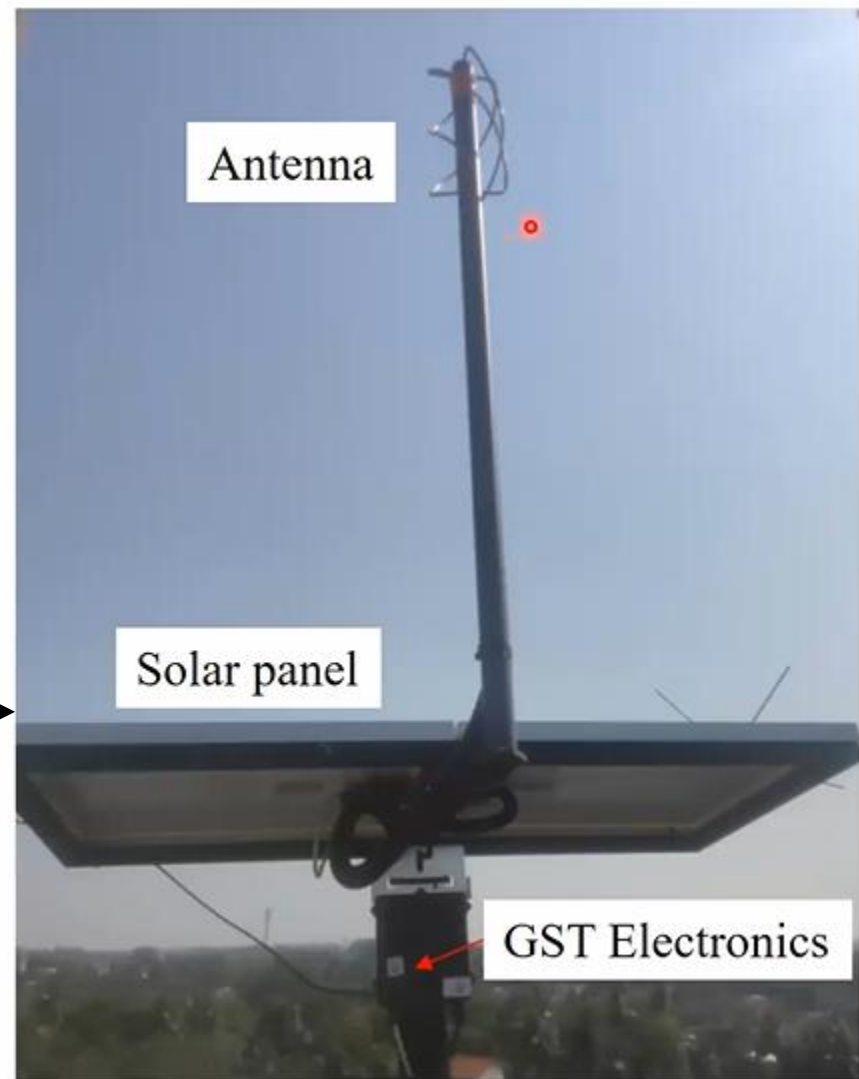
From Sri Lanka – Tharindu

Current Development



Status – Proceed to fabrication

Status – Ready for deployment



Updates from GST Network Countries

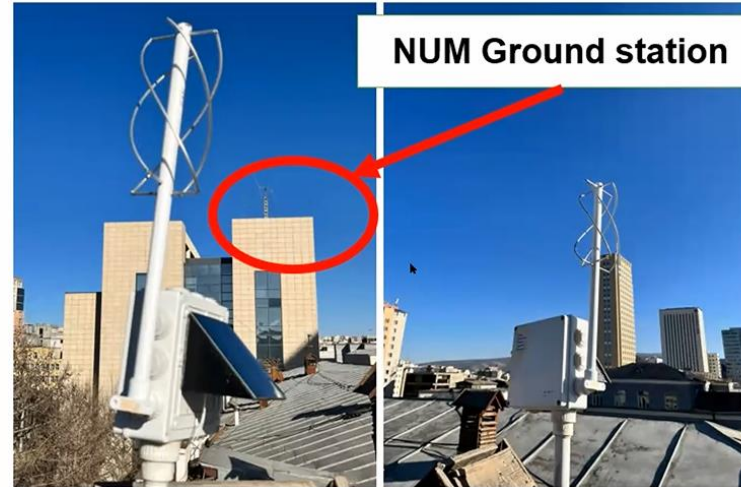
From Paraguay – Luis Miranda



Status – Ready for deployment



From Mongolia– Barsbold



GST transmitter with KyuTech's board

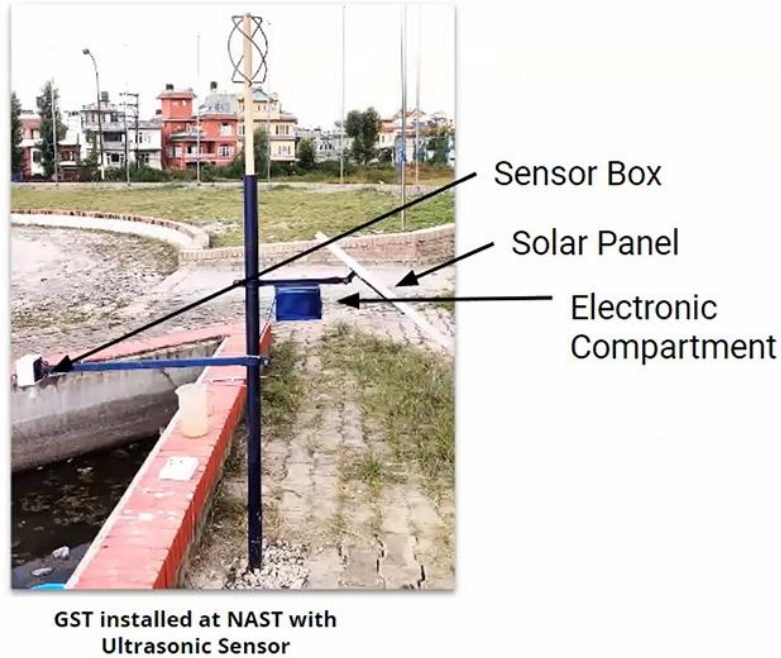


GST transmitter developed by NUM team

Status – Ready for deployment

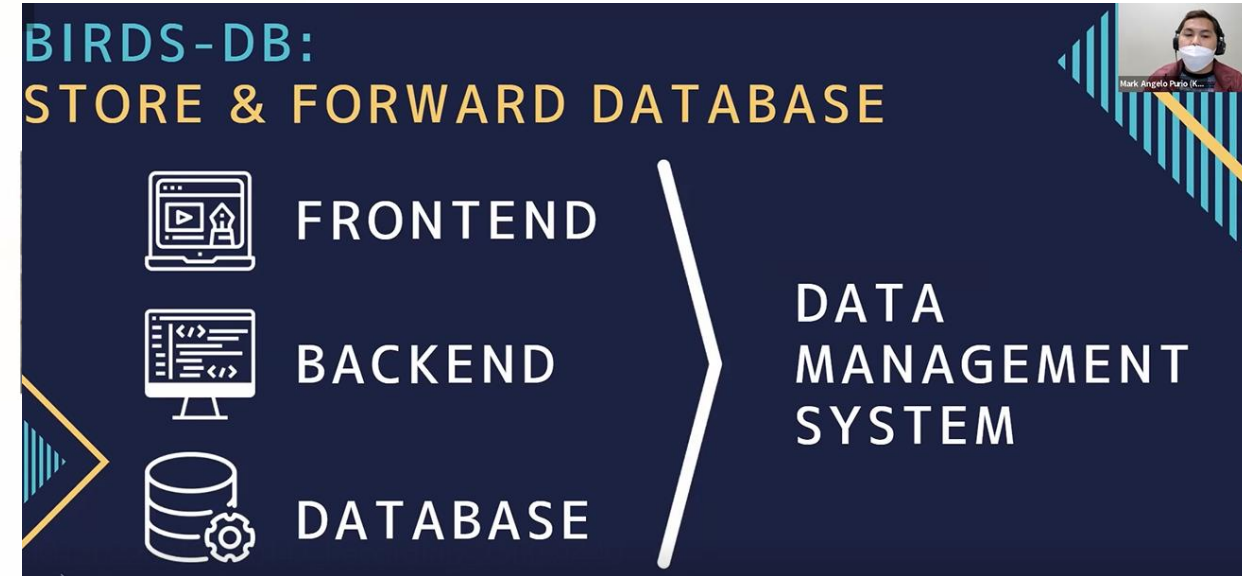
Updates from GST Network Countries

From Nepal – Sirash



Status – Ready for deployment

From Kyutech– Mark Angelo Purio



Database management and distribution for GST Network countries. Status – Finalization

Updates from Ground Station Operations

From Kyutech – Adolfo Jara (BIRDS-4)



BIRDS-4 satellite takes pictures of Japan and Paraguay

From Kyutech– Victor M (BIRDS-5)

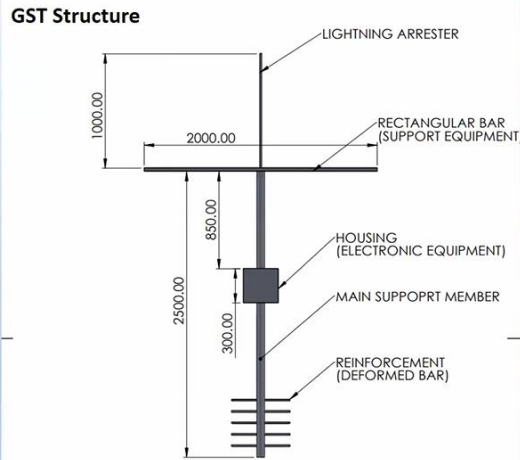


BIRDS-5 team completed FM assembly and are awaiting delivery to JAXA

Updates from Zimbabwe and Uganda

From Zimbabwe – Tungamirai Zvenamo

GST Test Setup and Structure



GST starting to take shape and ground stations almost ready for operation of BIRDS satellites



Elevation rotator



Azimuth rotator

From Uganda– Hebert Abigaba



Ground station assembly has begun and awaits license for operation. GST parts will be shipped from Kyutech.



BIRDS-3 Operation Competition Prizes

1. Ground station with the highest number of CWs received from August 11th (00:00 UTC) to September 11th 00:00 UTC 2021- **AEP GS**

Paraguay



SDR and HEX Keyboard for fast CW Input

2. Ground station with the maximum amount of data downlink from August 11th (00:00 UTC) to End of Life (EOL) of satellites – **NAST GS**

Nepal



Nano Vector
Network Analyzer

3. Ground station with the highest number of CWs received from deployment to end of life of the satellites

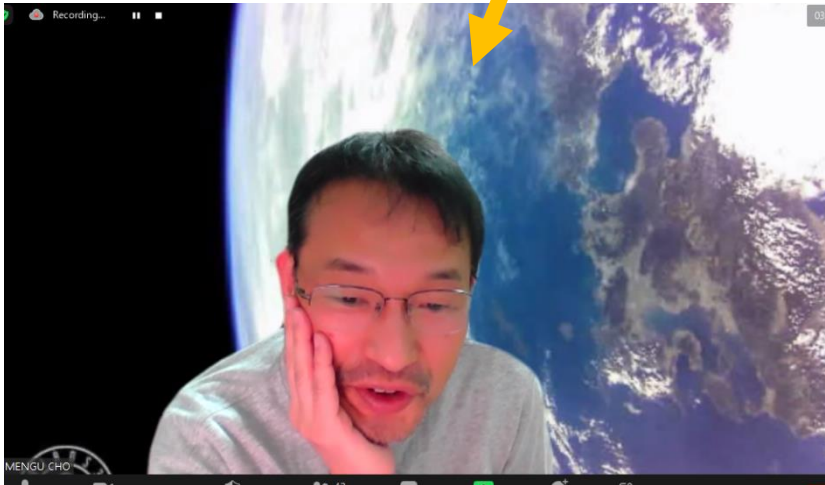


- **The Philippines GS**

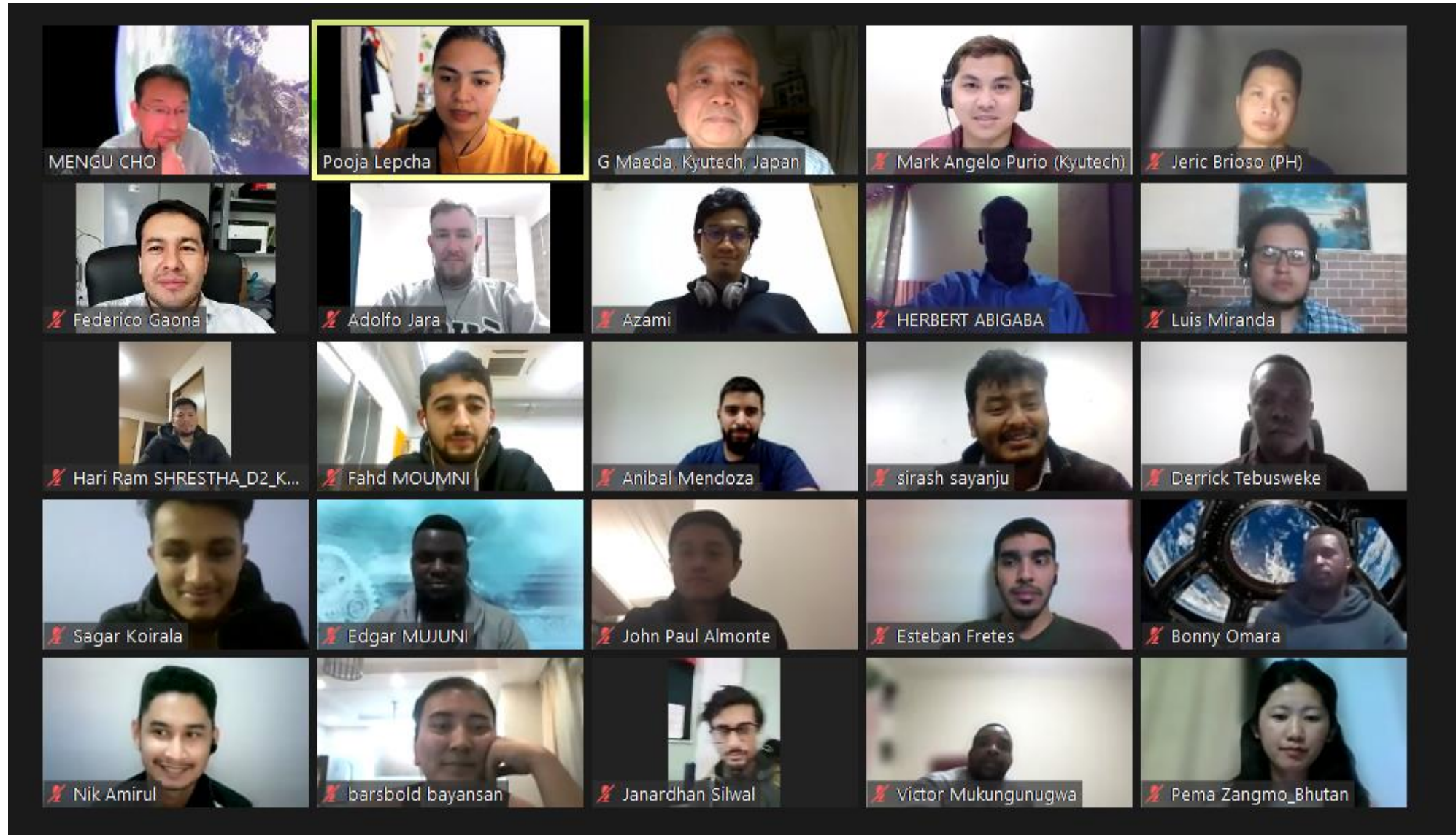
Tiny Spectrum Analyzer
with connectors

Key Discussions

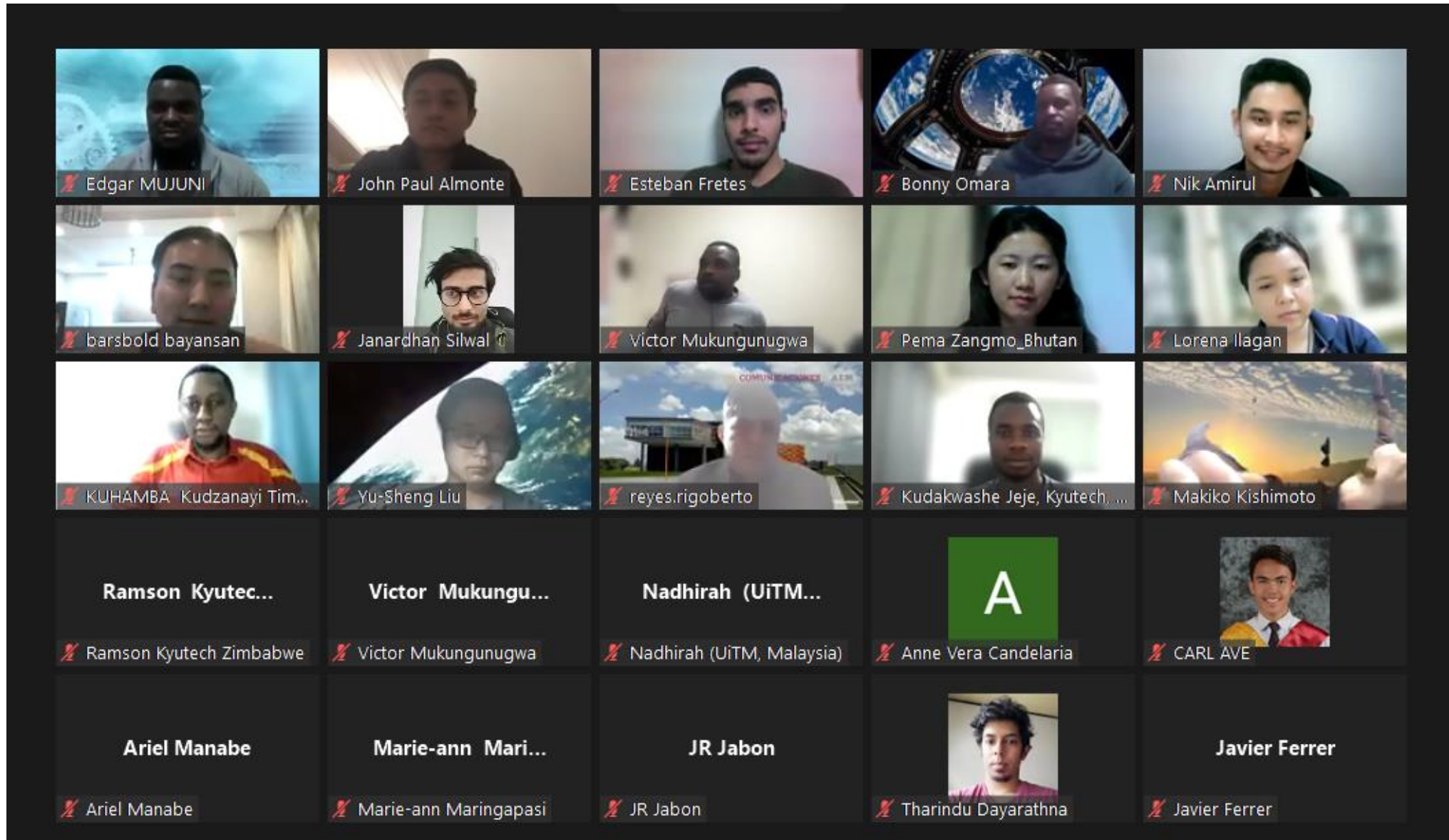
- All GST builders presented their progress of local GST development.
- Most of the GST builders presented and confirmed that their GST is ready for deployment
- Store and Forward mission of KITSUNE will be initialized upon receiving license for operation of GST in Kyutech.
- Special mentions for **Cho sensei** and **Maeda sensei** for the opening and closing remarks



Participants photo sessions



Participants photo sessions



Thank you everyone for
being part of this
GST Workshop.
See you again in the
next workshop.

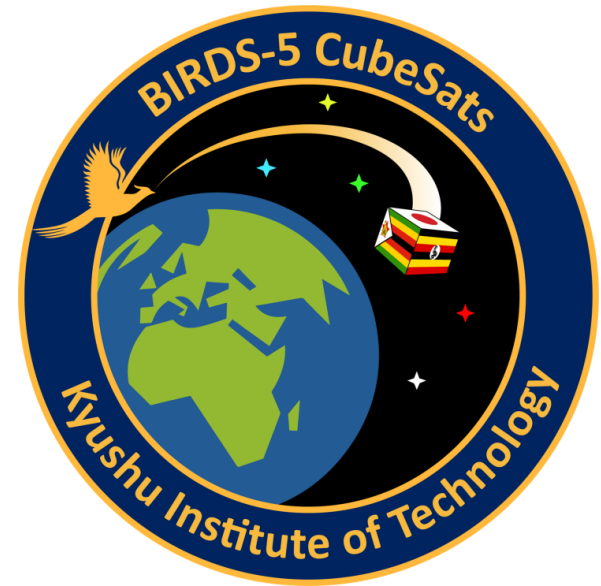


End of the workshop report

African Space Generation Workshop



By : Fahd MOUMNI
18/04/2022



SGAC : Space Generation Advisory Council

- The SGAC community gathers all young people from 18 to 35 years old who are interested in Space.
- They are part of the UNOOSA and have a their word to give in each general assembly.
- People from all countries and all backgrounds gather and work all the year, voluntarily, to target specific objectives in the space field.
- There are National Point of Contacts in each country and they usually lead events about space that can happen in the country



SPACE GENERATION
ADVISORY COUNCIL

SGAC Logo

African Space Generation Workshop (AF-SGW)

- The African Space Generation Workshop is the greatest official event held by the SGAC for the continent of Africa
- “It is a two-day hybrid workshop, which brings together students, young professionals, industry experts and government stakeholders from across the African continent”

Source : <https://spacegeneration.org/5th-af-sgw21-home>

- The last AF-SGW was held in South Africa (November 2021).



The 5th AF-SGW Logo

The next AF-SGW is to be held in ...

• **Morocco !!!**



- Here is how it happened : I went to IAC in Dubai in October, have been in contact with the National Points of Contact in Morocco, we started having meetings and applied for the bid in January...In less than 3 months we are going to organize one of the main continental space events !!!!
- **Mark your calendar : 7th November 2022** starts the two-day workshop in **Rabat, Morocco**.
- **The delegate invitations are yet to be sent.**



Moroccan Flag in Space

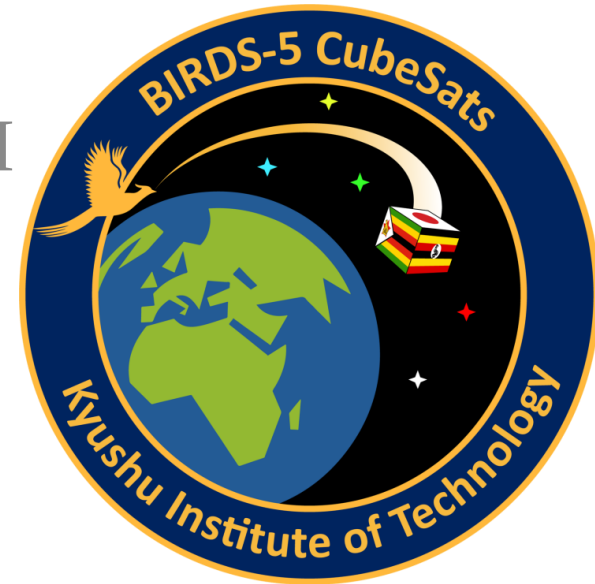
<https://www.maghrebdailynews.com/11142-moroccan-flag-space.html>

End of this section by Fahd

Meeting Space Lawyers at Dubai



By : Fahd MOUMNI
07/APR/2022



About Space Law

- Space Law is the very set of rules that governs space-related activities.
- The very first discussions about Space Law started in 1919.
- There are five international treaties and five international principles defined by the United Nations.
- Which ever country wants to use space should agree with those rules.
- The main institution dealing with Space Law and making sure rules are applied is the UNOOSA (United Nations Office for Outer Space Affairs)



UN Assembly about Space Law

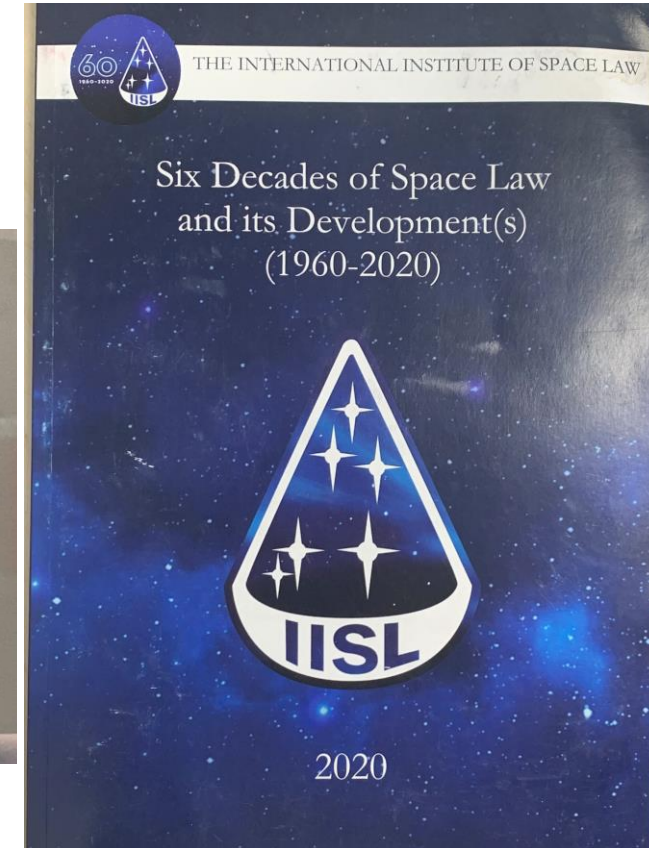
www.unoosa.org

About the IISL

- The IISL : International Institute of Space Law, “is the global association for space law with individual and institutional members from almost 50 countries. The IISL’s key mission is the promotion of further development of space law and expansion of the rule of law in the exploration and use of outer space for peaceful purposes.”

Source : <https://iislweb.space/>

- The IISL is located in Paris, very close to the headquarters of the IAF.
- The current president of the IISL is Prof. Dr. **SHROGL** Kai-Uwe



The logo of the IISL was visible during their annual awards dinner in Dubai and on the book they offered us about the history of the institution

How was the dinner ?

- I met many interesting people ! I was afraid not to fit in as it is not my background but I was very well welcomed !
- I met people from many countries and generations !
- In fact, I met Okumura sensei (top picture right side) and Aiko sensei (middle of the picture) who shared with me some discussion about BIRDS satellites. Okumura sensei works at UNOOSA and she gave a Space Law lecture at Kyutech and Aiko sensei teaches at Keio University.
- Prof. Dr. SCHROGL, the president of the IISL was also there moderating the whole event.
- The food was delicious by the way ! And I learned a lot from being around those people.

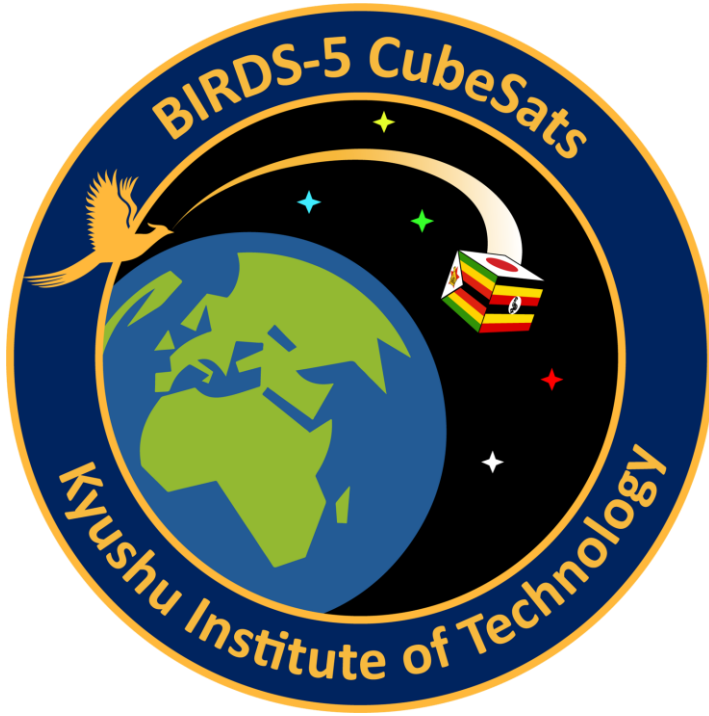


Delicious dinner !

Some personal take-aways

- **Space Law** looks very interesting and I regret not taking classes in it !
- I am from an emerging country and space is the most international field so diversifying my background in the space field is also necessary.
- Space Lawyers know that their field looks new to many people even if it now completes almost a century : They are welcoming anyone who is interested, especially from countries they can themselves learn from !
- Do not limit yourself to engineering...try to broaden your mind !

**THE END OF FAHD'S IISL REPORT
FROM DUBAI**



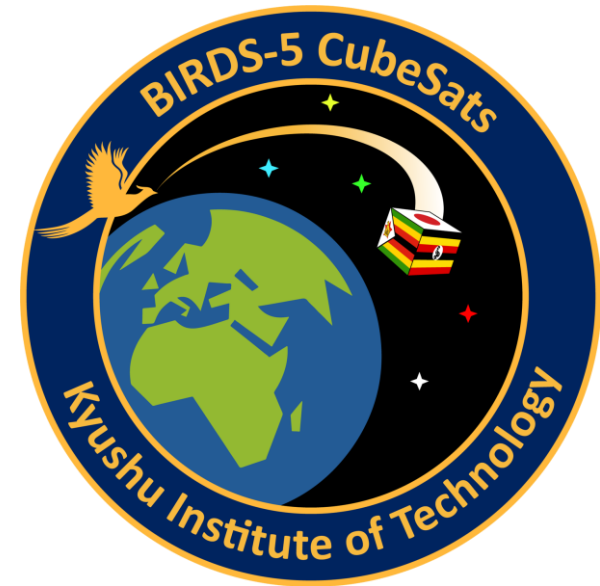
The following sections
are the **final BIRDS-5
articles** for the ***BIRDS
Project Newsletter***

(compiled by Timothy of Zimbabwe)

PINO test



By : Kohei Kamitani
2021/02/19



PINO Power Line

The BIRDS-5 Japanese satellite, *Taka*, is equipped with a mission instrument developed by JAXA called PINO.



Fig.1 Taka



Fig.2 RAB board

PINO and the satellite bus system exchange power, commands, and other information via an access board called RAB.

However, the last time we tested the integration of the satellite and PINO, the test was not successful due to a voltage drop in the switch circuit on the power line of RAB.

Cause of voltage drop

The N-MOSFET used in the power line had a large on-resistance, causing the voltage to drop.

Therefore, I changed the N-MOSFET with large ON-resistance in the RAB to an N-MOSFET with small ON-resistance.

I also installed N-MOSFETs in parallel to reduce the resistance by a factor of two.

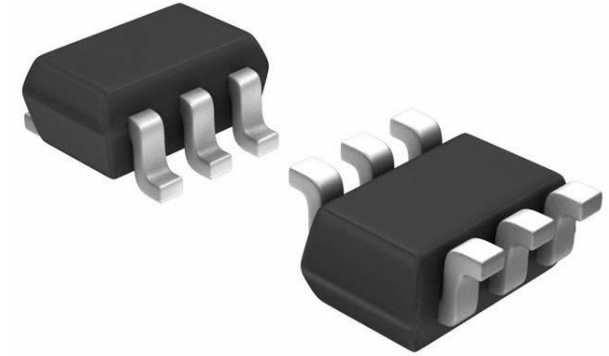


Fig.3 N-MOSFET (350 mΩ)

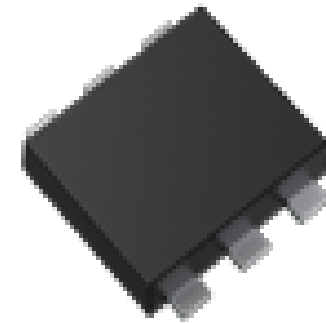


Fig.4 New N-MOSFET (15.5 ~ 23.8mΩ)

PINO Test

After the design of the RAB board was changed and the new RAB was completed, the integration test with PINO was conducted.

As a result of the test, we were able to successfully operate PINO without experiencing a large voltage drop during the test.

We also tested the PINO and OBC communication lines in addition to the power lines, but no problems arose and the tests were successful.

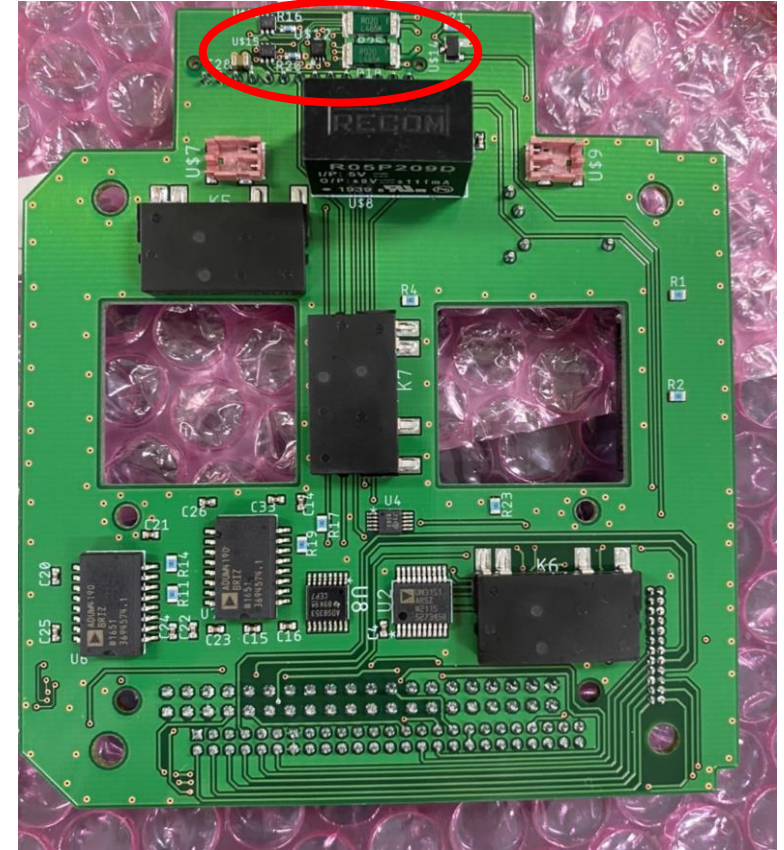
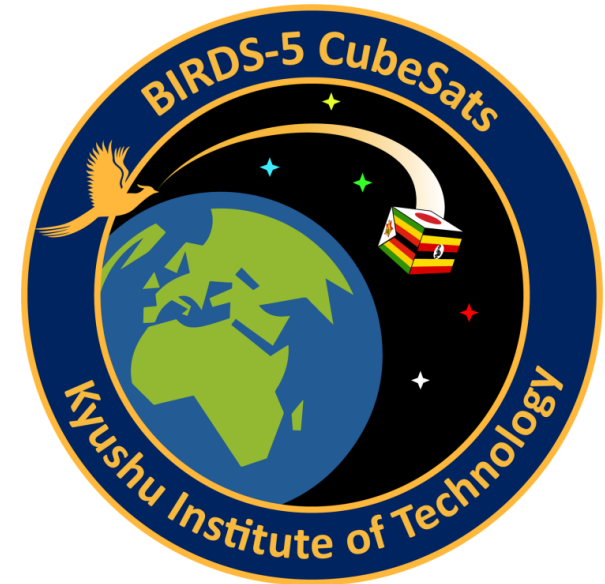


Fig.5 New RAB Board
(The position of the circle is the switch circuit for the PINO power line.)

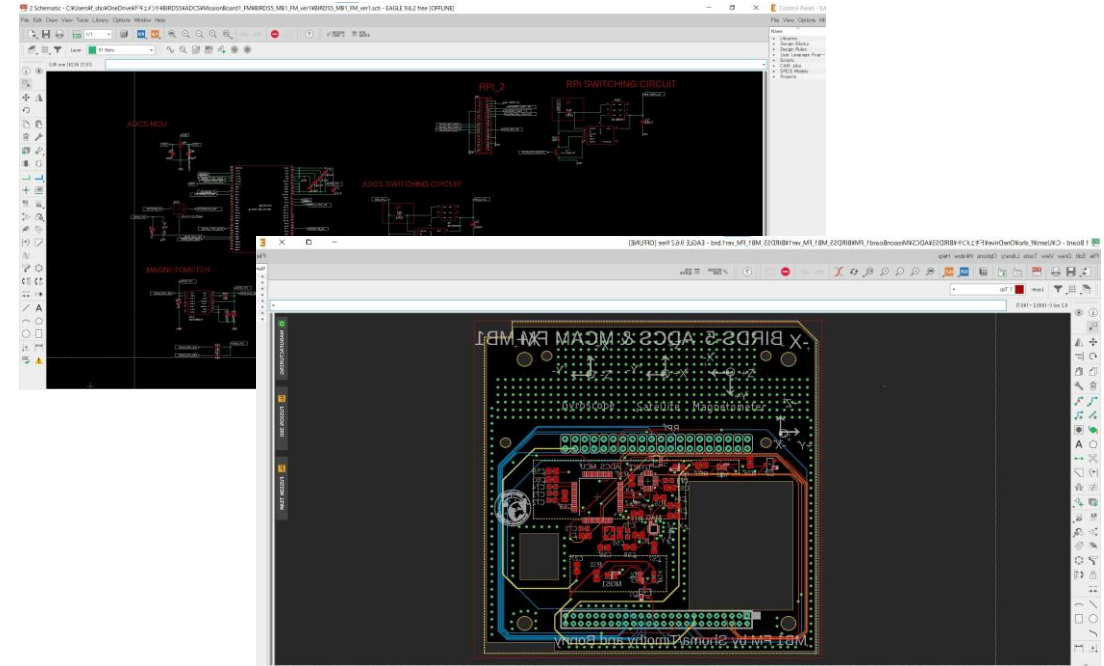
END OF THIS BIRDS-5 ARTICLE

ADCS

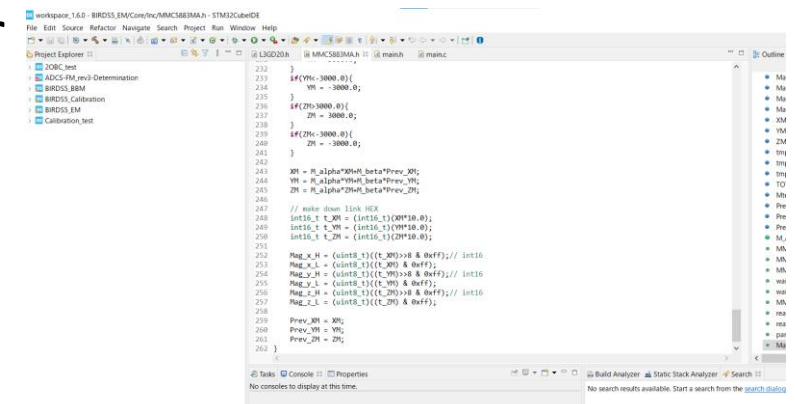
Fukudome Shoma



- Mission Board 1 PCB design
 - There are 3 boards for missions on BIRDS-5(MB1, MB2 and RAB.)
 - I designed MB1 for BIRDS-5.



- ADCS programming
 - I programmed ADCS MCU which collects data for attitude determination and communicate with OBC.



Personal Growth by working BIRDS-5

- When I joined BIRDS-5 project, everything was new to me and I always felt anxious.
- In this 2 years, I have learned not only technical skills and English, but also intercultural communication. Also, learned that what is most important thing for projects is not the individual skills but trusting relationship each other.
- Using what I've learned in BIRDS-5, I want to be a good system engineer.

END OF THIS BIRDS-5 ARTICLE

COTs camera to obtain Multispectral images to facilitate analysis of soil fertility, water quality and land use and cover.



Bonny OMARA

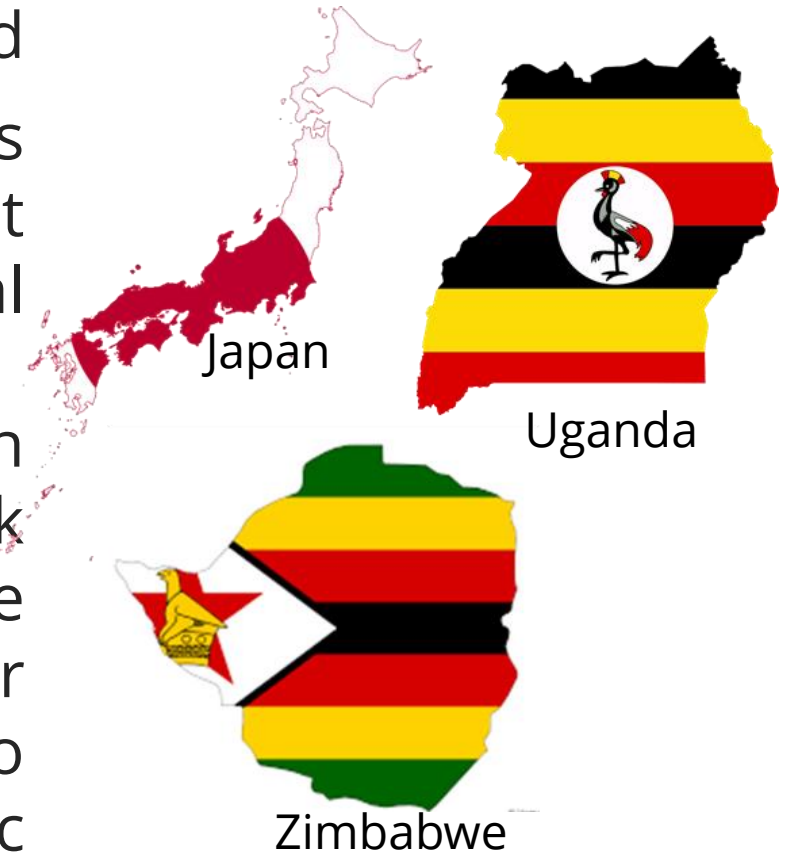
From UGANDA

April 11, 2022



Background

Participating Nations are facing challenges of rapid urbanization coupled with unsustainable settlements and land use patterns, which continue to impact planning for infrastructure and provision of social services due to lack of spatial and textual data. Further still, the agriculture productivity has been gradually reducing because most farmers lack information on how to improve soil fertility. Satellite technology provides up-to-date soil fertility maps for the country to guide fertilizer applications. It also provides cost-effective way for developing periodic fertility maps.



Goals

- ❑ To design, develop and fabricate a camera subsystem prototype that uses a COTS camera to obtain viable multispectral images.
- ❑ To verify that the Camera subsystem design is functional in 1U CubeSat platform in Low Earth Orbit (LEO).

Specific Objectives:

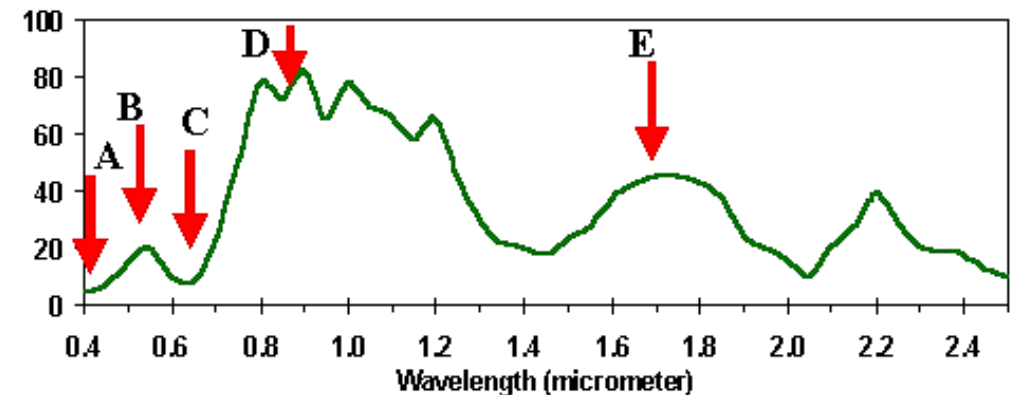
- ❑ To capture images in specific wavelengths/bands (550nm, 680nm, 720nm and 790nm) and time.
- ❑ To extract useful information from satellite imagery and provide interpretation for soil fertility, water quality and land use and cover.

What is Multispectral Imaging ?

Standard RGB cameras are no longer sufficient to perform in-depth inspections. Some applications call for non-standard RGB bands, while others call for a mix of visible and non-visible wavelengths.

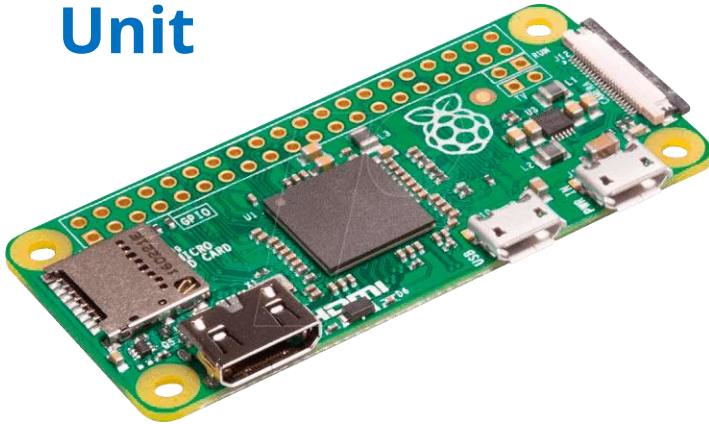
In the electromagnetic spectrum, multispectral cameras acquire image data at a specific band. Filters or other instruments sensitive to only certain wavelengths, can be deployed to isolate the wavelengths.

Multispectral imaging provides for extraction of information that the human eye hardly sees and consists of spectral bands which are discretely positioned away from each other as in the graph below. The spectral bands do not have to be continuous as in the case of hyperspectral imaging.



BIRDS-5 Imaging system components

Microcontroller Unit



RasPI zero W
Memory: 512MB RAM
Storage: microSD card compatible.

Image Sensor



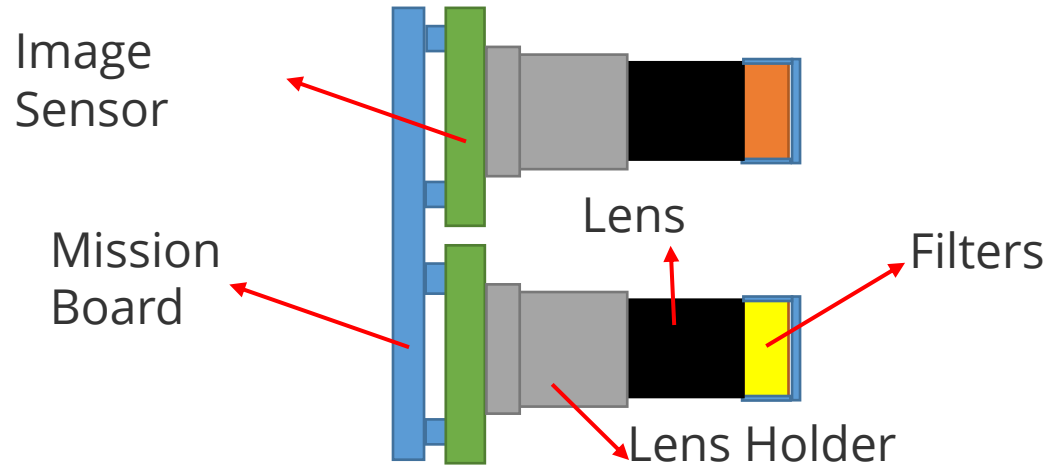
Arducam OV2311 mono camera for RasPi

Lens



- ✓ Focal Length = 12mm
- ✓ Ground Resolution of less than 100m
- ✓ Ground Swath (164X132km)
- ✓ FOV: ((D/H/V)°26/23/13)

Conceptual Design



Integrated System



Two image sensors each bearing unique filter are installed in each satellite. Both sensors capture the same target simultaneously in a single trigger. Images are saved in the internal memory, and later transferred and downlinked to the ground station. The Image analysis is performed on ground using GIS software.

Personal Growth



There are a couple of non-technical skills that I perfected overtime during BIRDS-5 project, and among them are: strategic planning, creativity, and time management.

Being well organized helped me to maintain a clear picture of what I needed to complete and when. It also helped me locate critical documents easily and have a tidy environment as exhibited in photo. On the other hand, we often challenge the status quo and consider new possibilities.

All satellite engineers, for which I have no exception, ought to have a mix of technical and non-technical skills because satellites, once launched and deployed, cannot be repaired or serviced. In other words, ***"No room for errors"***.



Future hopes and dreams

The overwhelming need for small-satellites in most countries is on the rise because of the short development period and reduced cost.

Using satellite technology, I want to help Uganda achieve its technological goals while also addressing the real problems that citizenry are having. I've learnt a lot from BIRDS-5 and Kyutech, especially about remote sensing, analysis, and interpretation of data.

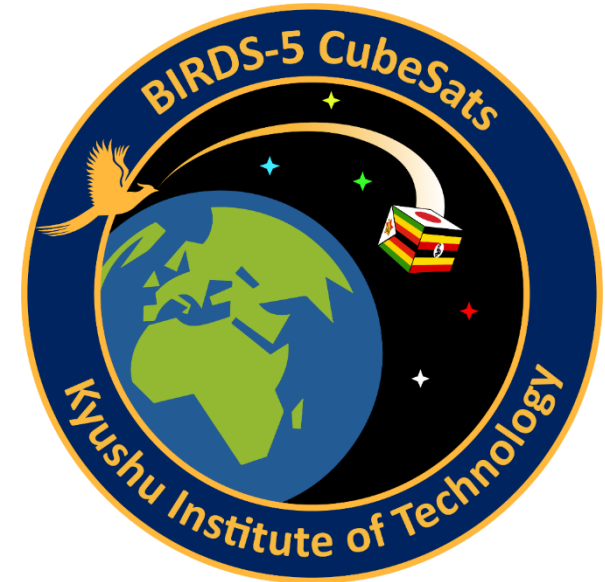
END OF THIS BIRDS-5 ARTICLE

BIRDS-5 Final Article



By : Derrick TEBUSWEKE

Date: 4th April, 2022



Technical Work Summery

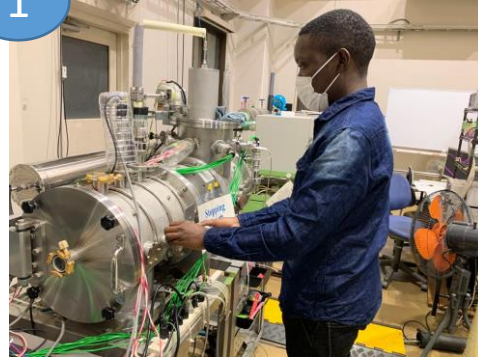
1, 2, 8 ~ Laboratory testing of CubeSat parts and verification of their in-orbit performance.

4 ~ Design and fabrication of PCBs using Software.

5 ~ Testing and qualification of Battery cells before they are used on the satellite.

6, 7 ~ CubeSat assembly and programming.

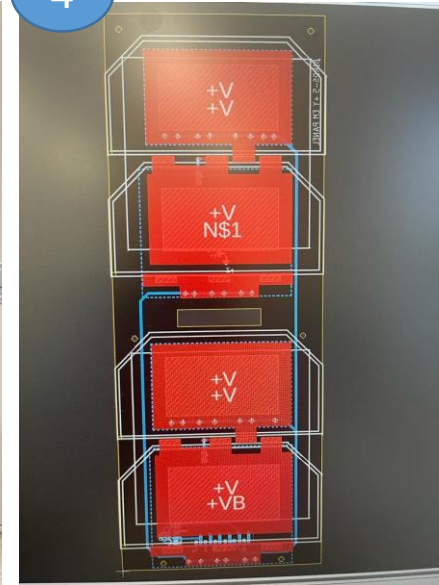
1



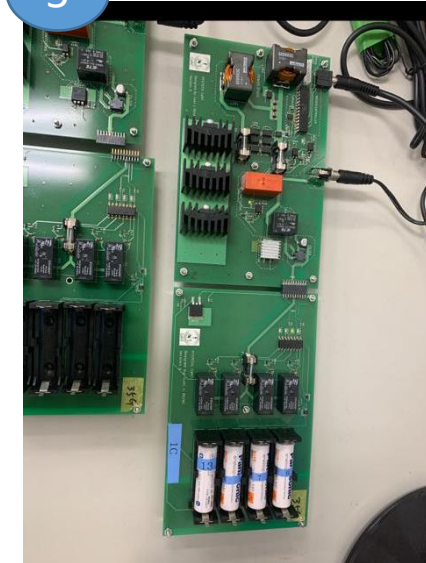
2



4



5



6



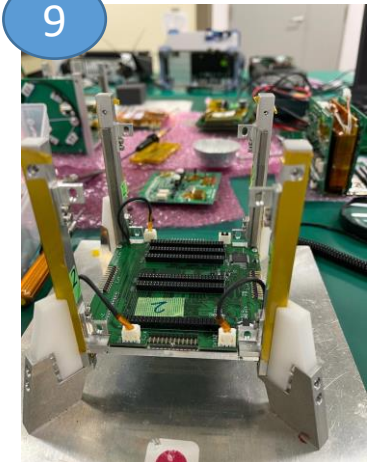
7



8



9



Personal Growth Summary

I learned:

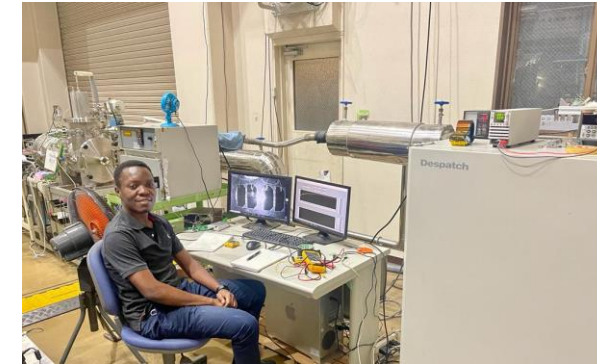
1. Teamwork
2. Lean management approach
3. Satellite development phases
4. Satellite operation



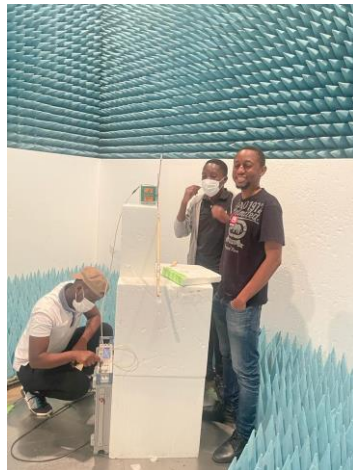
Group photo with BIRDS-5 members.



Ground station operation demo.



Thermal vacuum testing of solar panels.



Teamwork setting up of anechoic chamber.



BIRDS-5 members organizing their lab.



BIRDS-5 members attaching solar cells.

Hopes and Dreams...

- Research more about Satellite electrical systems.
- Help develop my home country's satellite development capabilities.



Posing with the FM CubeSats



Posing with the EM CubeSats



At the launch of KITSUNE satellite



Having a brunch with fellow African students on campus



A memorable photo with JAXA/ISAS scientist, Prof. Mitani.



FM CubeSats built by us.

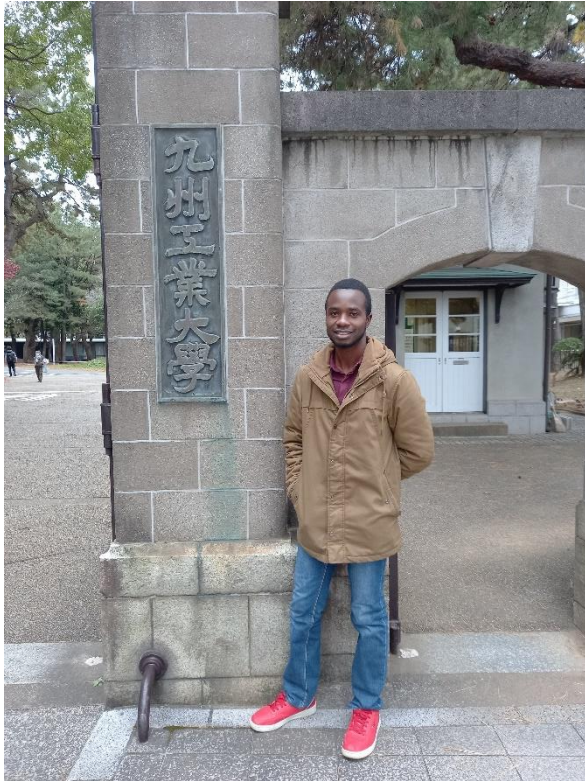
26. BIRDS-5: Final article (Jeje)

By KUDAKWASHE JEJE, PNST fellow from Zimbabwe

I am Kudakwashe Jeje, a PNST Masters student and also part of the Birds 5 Project. I joined the Birds project after coming to Kyutech in November last year.

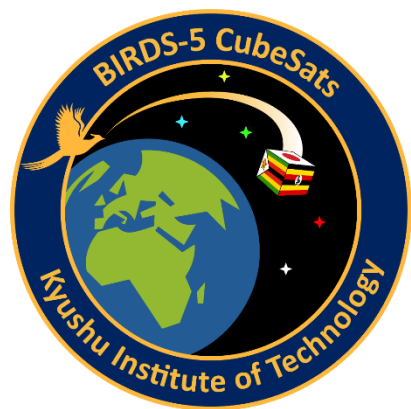
I was part of the structures team and the Attitude Determination and Control System.

I was mainly in charge of satellite assembly and disassembly of the structure since I joined the project at an advanced stage when the Flight Model was almost complete.



As for ADCS I took part mainly in tests and validation of the ADCS and structure. We checked the consistency of the ADCS gyroscope data and also carried out gyroscope calibration using the rate table. We also carried out the environmental tests on the satellites (TVT Thermal Vacuum Test, Vibration Test and Anechoic Chamber Test).

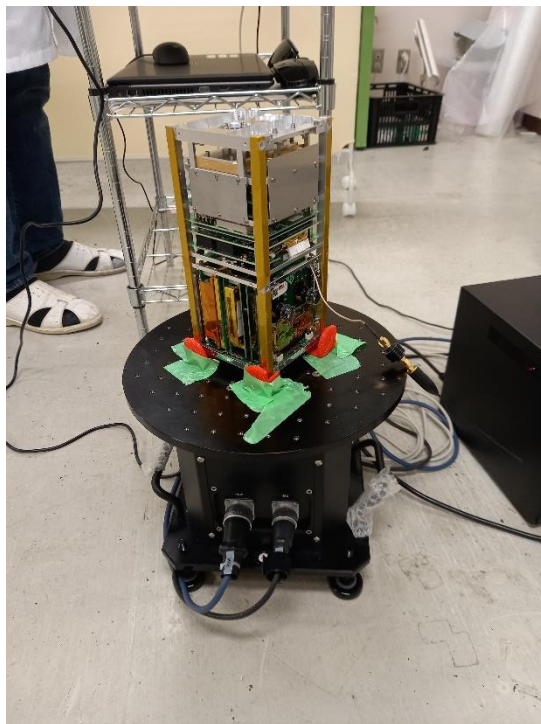




I learnt a lot from the BIRDS-5 project in a very short space of time since it was my first satellite project. I was used to working with big structural components compared to the small and intricate parts of the satellite structure.

The BIRDS-5 taught me the importance of team work amongst all else. It would have been impossible to complete the project without cooperation amongst all the Birds members.

I hope to use the technical and soft skills I gained through the BIRDS-5 project in the next satellite project I will take part in and also towards growing ZINGSA's very own first home grown satellite.

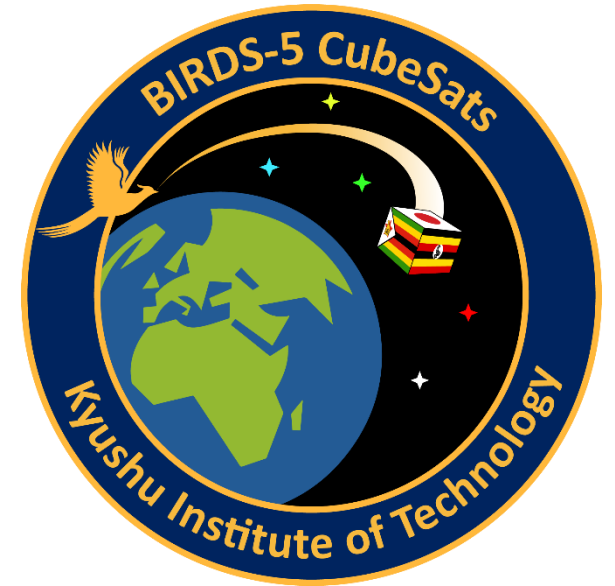


END OF THIS BIRDS-5 ARTICLE

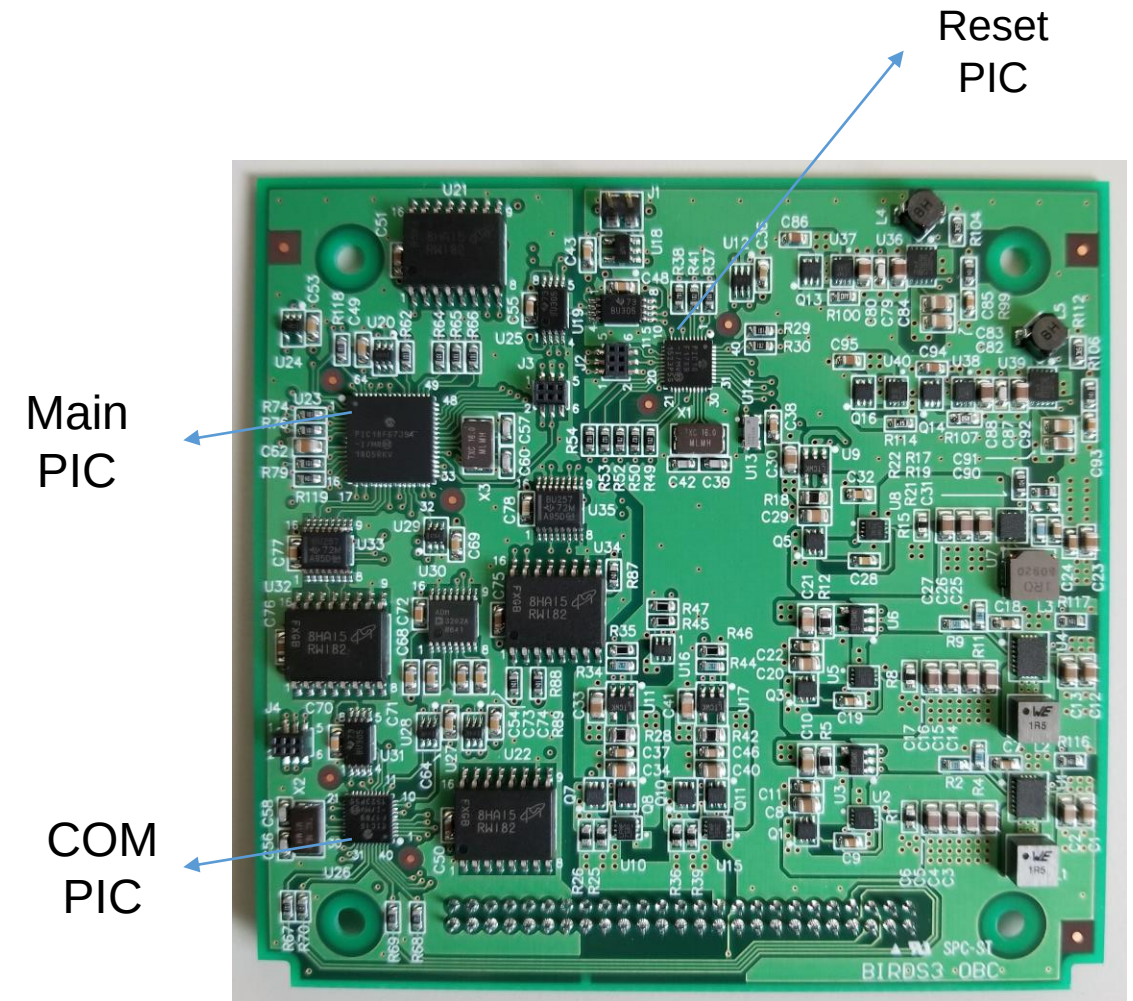
BIRDS-5 Satellite



By: Keenan Chatar
11/APR/2022



- Send the Continuous Wave (CW) Beacon
- Collect, store and transmit Housekeeping and Mission Data
- Analyze the Uplink commands received from Ground Station
- Execute mission commands and store mission data
- Monitor the general status of the satellite and survive space environment.

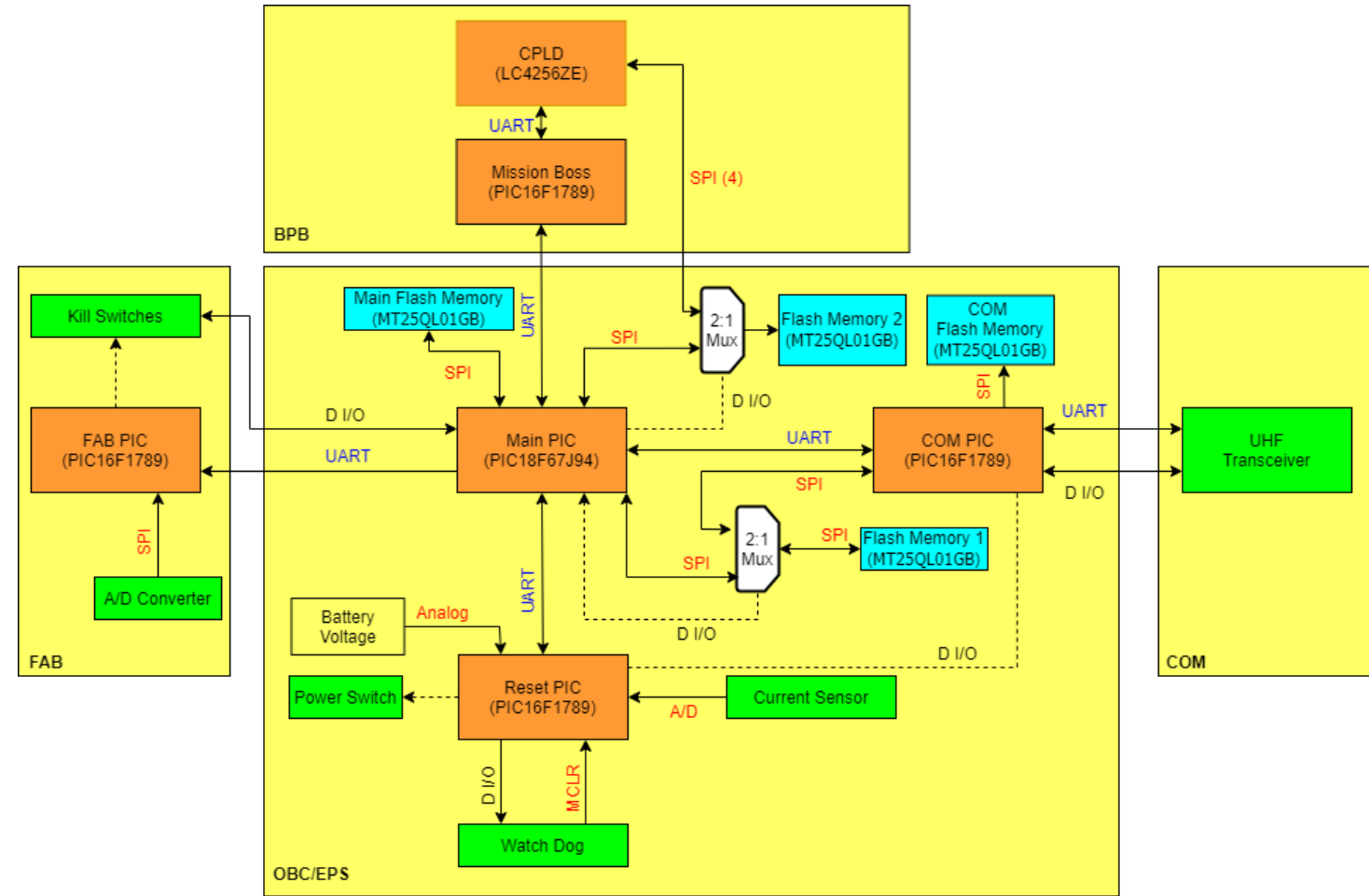


- Primary Systems:

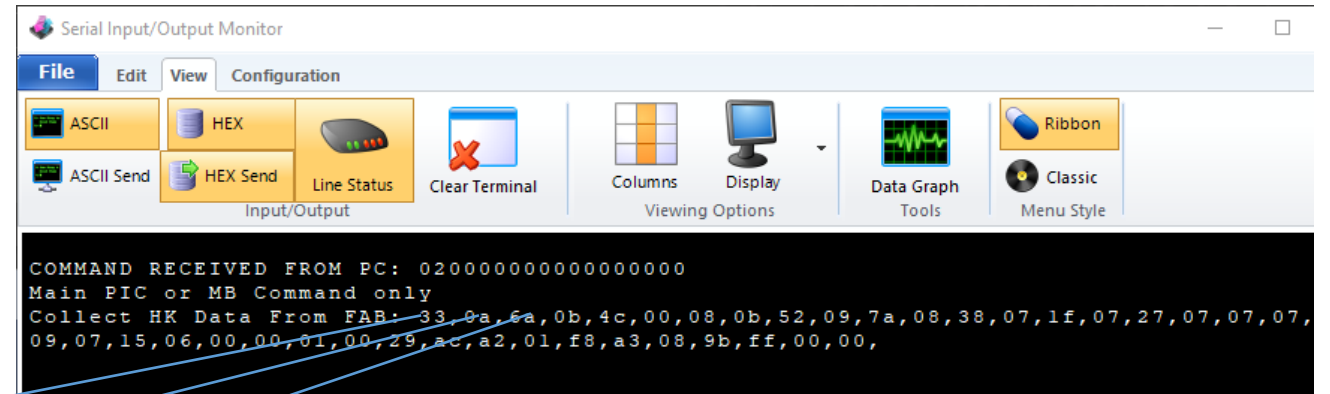
- 1) OBC/EPS
- 2) BPB/Missions
- 3) FAB
- 4) COM

- OBC manages data interface:

- Large data is handled by flash memory and multiplexer
- Regular messages interface is performed by UART



System Interaction



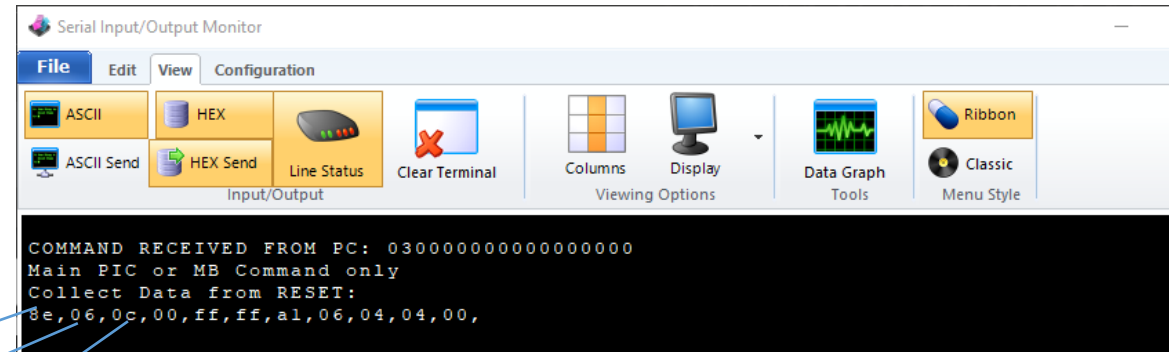
Request for FAB Data

- From Main to FAB

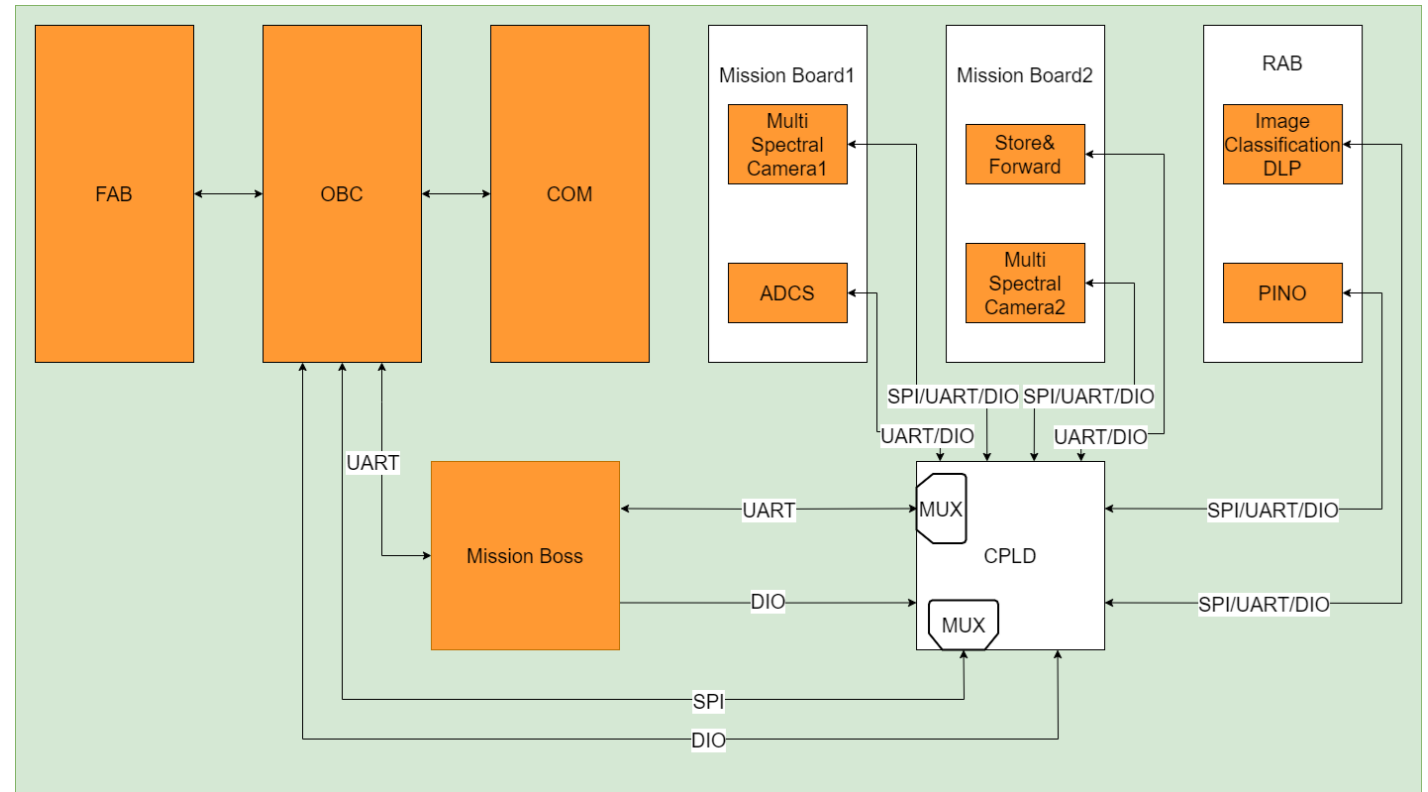
0X33	Temp_pX H	Temp_pX L	Temp_mY H	Temp_mY L	Temp_mZ H	Temp_mZ L	Temp_py H	Temp_py L	Temp CPLD H
Temp CPLD L	Temp_pZ2 H	Temp_pZ2 L	Vol_pX H	Vol_pX L	Vol_mY H	Vol_mY L	Vol_mZ H	Vol_mZ L	Vol_pY H
Vol_pY L	Vol_pZ H	Vol_pZ L	I_out +X	I_out -Y	I_out -Z	I_out +Y	I_out +Z	I_Raw	Src_Voltage
Raw_voltage	SRC_current H	SRC_current L	PWR_Bat	Batt_Current H	Batt_Current L	Batt_Temp	Batt heater stat	Kill Status	

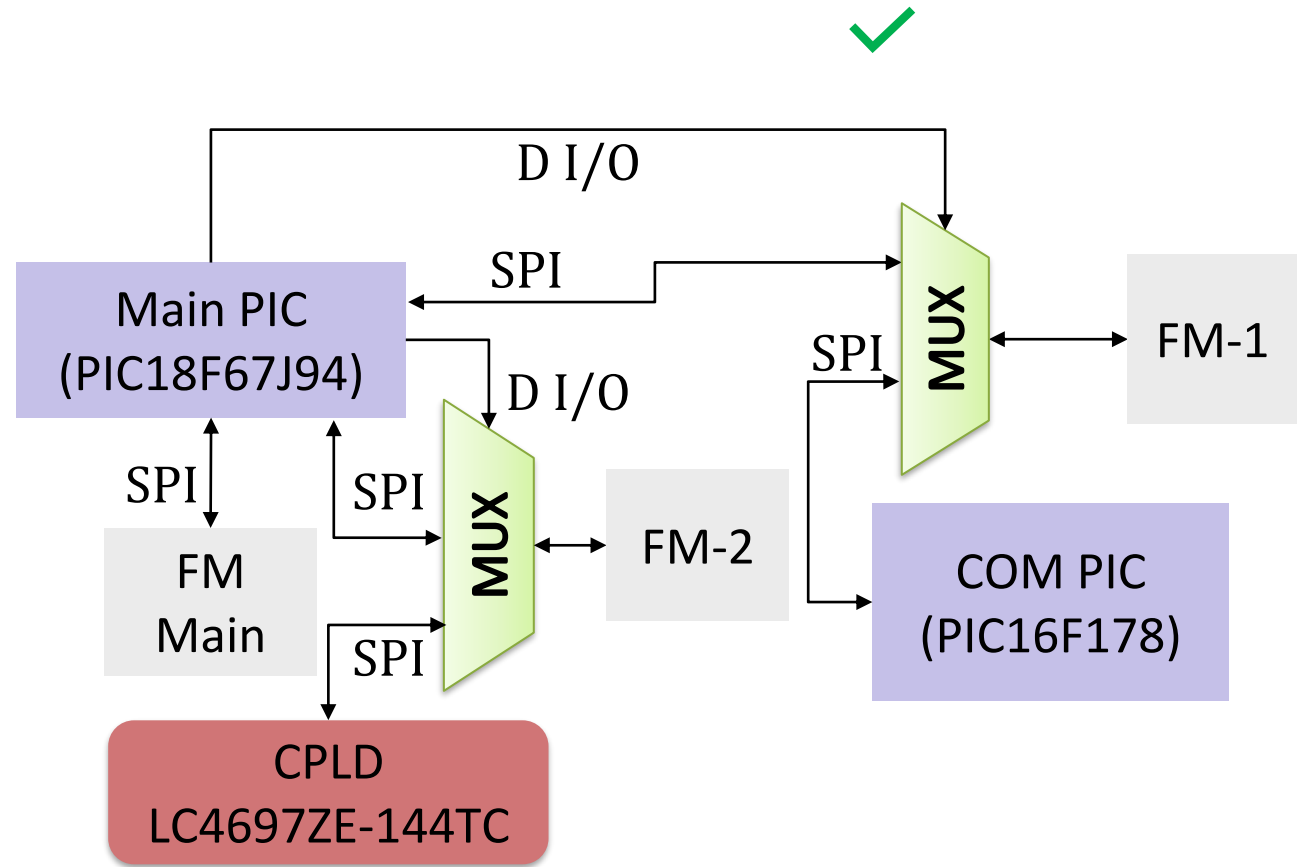
Request for RESET Data

- From Main to RESET



0x8e	Sec	Min	Hou	Day_H	Day_L	V out Raw	I out 3V3#1	I out 3V3#2	I out Unreg#1	I out 5V
------	-----	-----	-----	-------	-------	-----------	-------------	-------------	---------------	----------





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



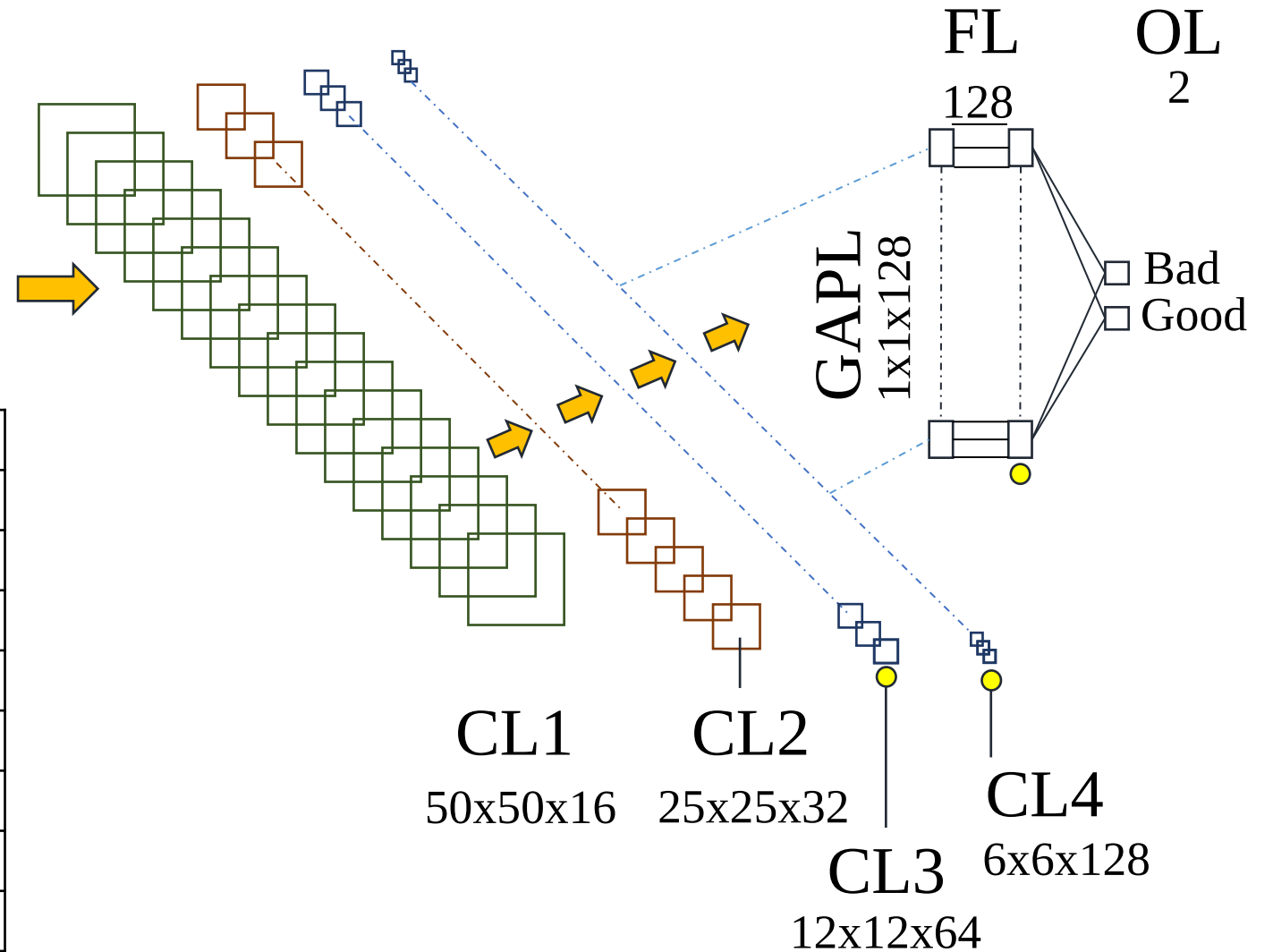
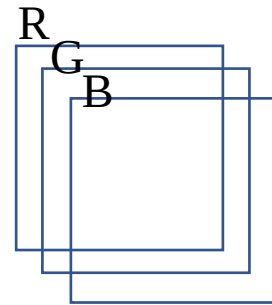
Image Classification and Segmentation

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

- Convolutional Neural Network

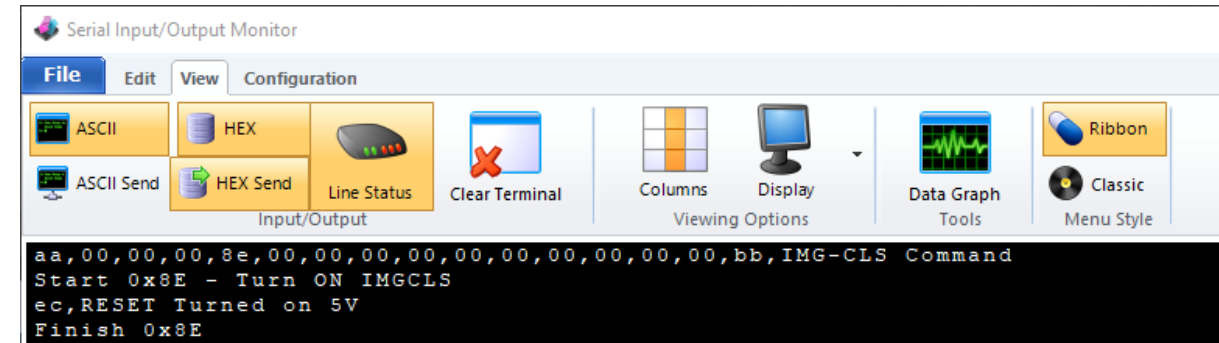
- Simple
- 8-layer Architecture

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



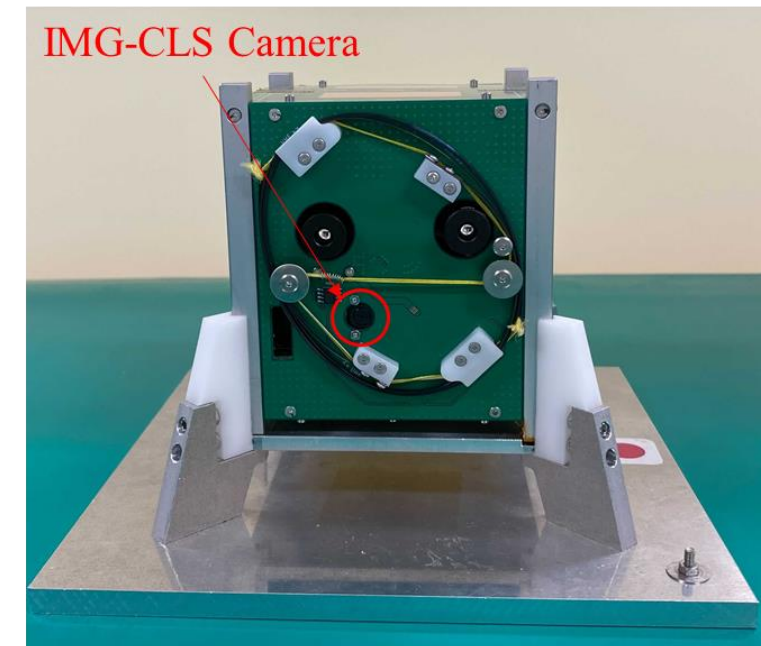
- Uplink IC ON Command from GS:

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



- Uplink Capture Command from GS:

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



Mission Mode Execution

- Downlink Image to GS
- Received and executed by COMM

BIRDS-5 Operation Software



Configuration

	COM Port	Baud Rate	Status
TNC	COM7	9600	☒
RADIO	COM11	9600	☐

Connected Cancel



Satellite

Radio Mode
☐ CW
☒ FM

Command Send

Save: C:\Users\cholab\Desktop

Received Data

CMD

```

C0 00 4A 47 36 59 42 57 30 4A 47 36 59 4C 45 30 3E F0 FF F0 FF 00 00 01 FF D8 FF E1 64 00
45 78 69 66 00 00 4D 4D 00 2A 00 00 00 08 00 0A 01 00 00 04 00 00 00 01 00 00 02 80 01 01 00
04 00 00 00 01 00 00 01 E0 01 0F 00 02 00 00 00 0C 00 00 00 86 01 10 00 02 00 00 00 0A 00 00
00 92 01 1A 00 05 00 00 00 01 00 00 00 C0 C0 00 4A 47 36 59 42 57 30 4A 47 36 59 4C 45 30
3E F0 FF F0 FF 00 00 02 9C 01 1B 00 05 00 00 00 01 00 00 00 A4 01 28 00 03 00 00 00 01 00
02 00 00 01 32 00 02 00 00 00 14 00 00 00 AC 02 13 00 03 00 00 01 00 01 00 00 87 69 00 04
00 00 00 01 00 00 00 DB DC 00 00 03 82 52 61 73 70 62 65 72 72 79 50 69 00 52 50 5F 6F C0
                
```

Analyze Clear

FF D8 FF E1...



[1, 0]
[Good, Bad]

Lessons learned

- Technical Skills:
 - Embedded Systems
 - Machine Learning
 - Computer Vision
- Interpersonal Skills:
 - Value of teamwork
 - Friendship is important to keep a team strong
 - Hardship is important for personal growth

I have made friends that I will carry for a life-time and I am extremely happy to have been given the opportunity to be a part of the BIRDS-5 Team.

A heartfelt thank you to all team members and supervisors. Cheers.

END OF THIS BIRDS-5 ARTICLE

BIRDS-5 to Me!



Maeda Sensei & Edgar (20/03/2022)

By: Edgar MUJUNI

10th April 2022



BIRDS Room (2020-2022)

BIRDS-5 to Me!

My Roles & Responsibilities

Distribution of tasks gave everyone responsibilities, where failure was not tolerated. I was responsible for the roles below:

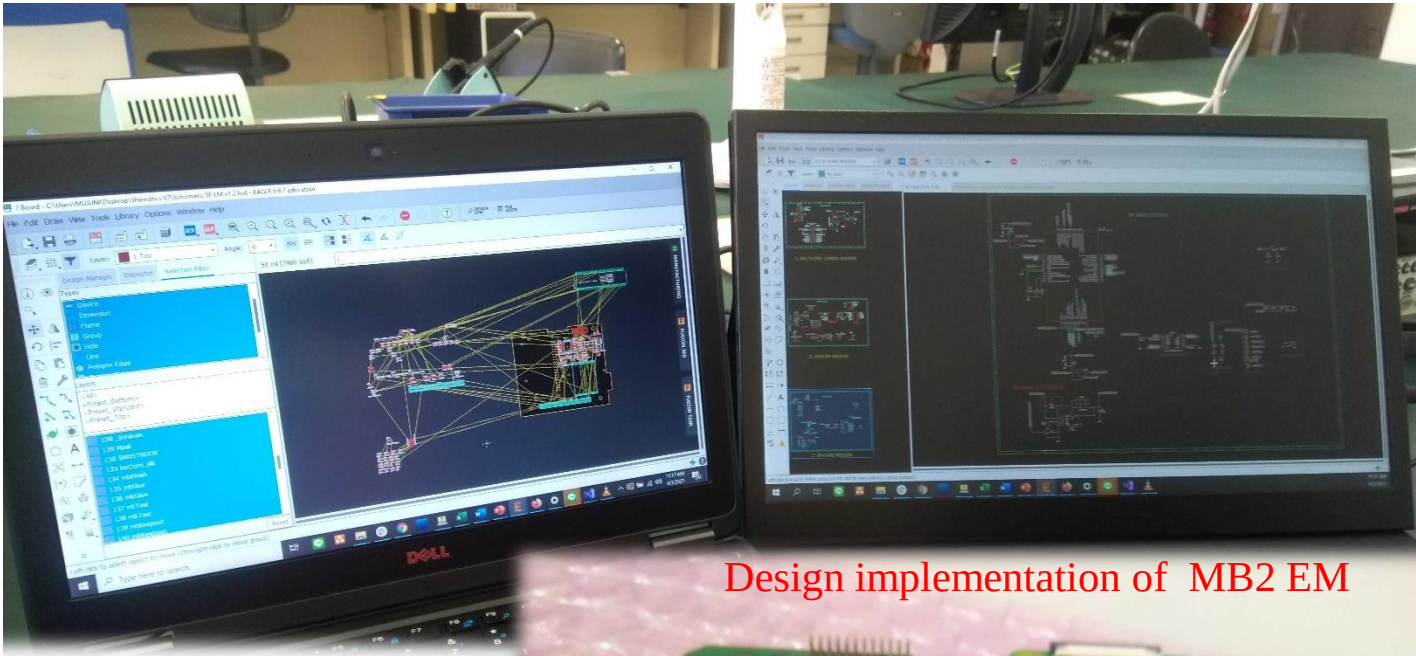
- APRS/DP Mission (Main)
- Store & Forward Mission (Main)
- Mission Board 2 Design (Main)
- GST Development (Main)
- Antenna Deployment (Main)
- Ground Station (Main)
- Inventory Management (Main)
- Communication Subsystem (Assistant)
- Frequency Coordination (Assistant)



Final days of successful communication tests of BIRDS-5 satellites

Mission Board 2

BIRDS-5 has three Mission Boards.
I have designed Mission Board 2 that has three of the satellites' missions.
These are; APRS/DP, Store & Forward, and Multi-spectral Camera Missions.
This was a very challenging task as it required optimum planning due huge components that these missions emplo



Design implementation of MB2 EM



RF Output Measurement



Detailed photo of MB2



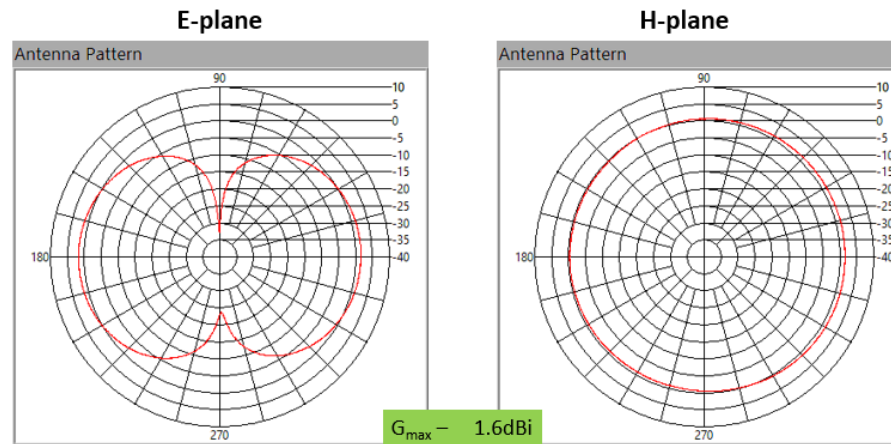
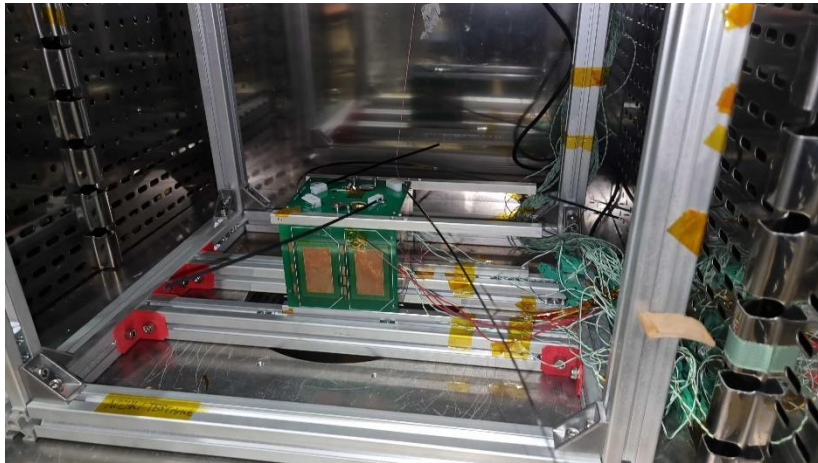
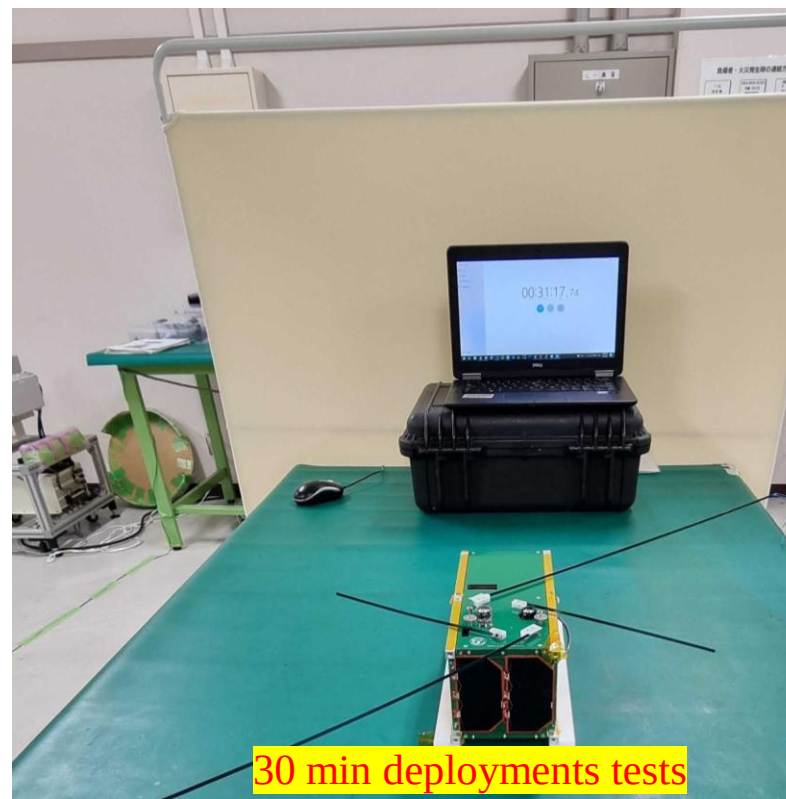
Three MB2 boards for BIRDS-5

Antenna Deployment

BIRDS-5 Satellite Antenna Configuration is Point Symmetric UHF Point Symmetric VHF (PUPV).

The two antennas support communications with the satellite in both UHF & VHF bands.

Antenna deployment process and system which must properly function when satellite is just deployed into the orbit to establish communications with the ground stations.



Deployment tests under extreme cold environments

UHF Antenna radiation Pattern

Three FM antenna panel boards

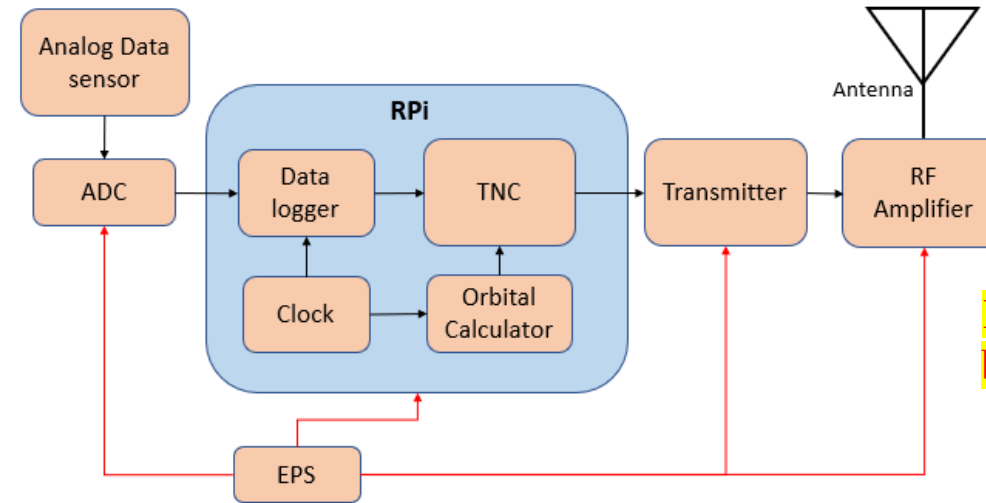
BIRDS-5 GST

The Ground Sensor terminals will support the BIRDS-5 Store & Forward mission.

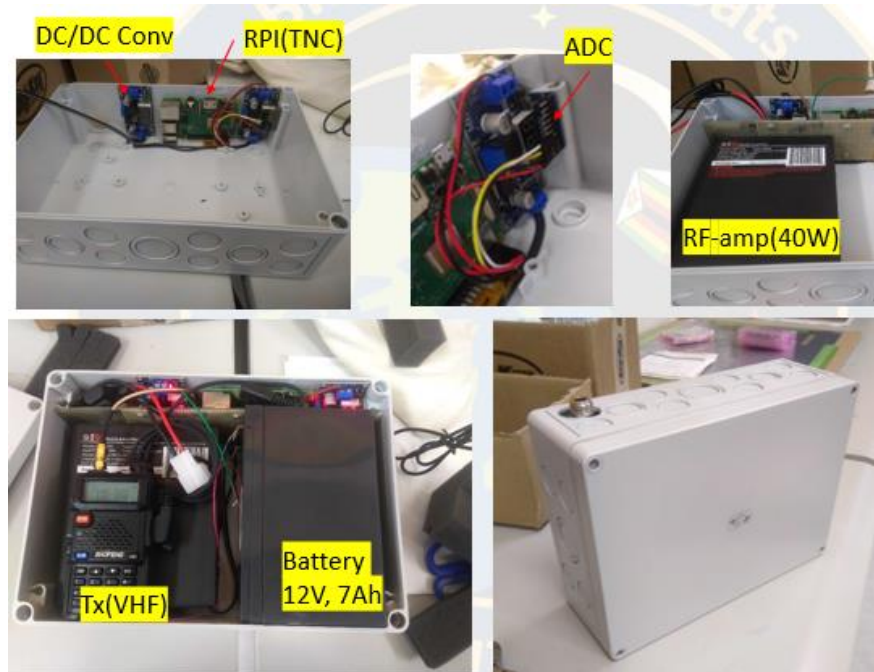
These GSTs will be situated in different remote areas of our countries to basically collect data.

These data will be up-linked to the satellite during pass which will store it and the relay it to main Ground station for Analysis.

This remote data will be primarily for Landslide monitoring & analysis, and Solar illumination measurement.



**BIRDS-5 GST
block Diagram**



GST components in a weatherproof PVC box



GST Satellite Tracking tests

BIRDS-5, *What a team!*

BIRDS-5 is my greatest team so far in a sense that different new people with varying background have come together and achieved success within the actual project timeline.

Failure (*'This is hard for me'*) is not tolerated under Prof. Cho's supervision.

His strict, constant & yet remote overseeing has been the core pipeline to successfulness of BIRDS-5, and other BIRDS projects.

I have come to prove that teamwork is the greatest tool in any project, not just the skills.

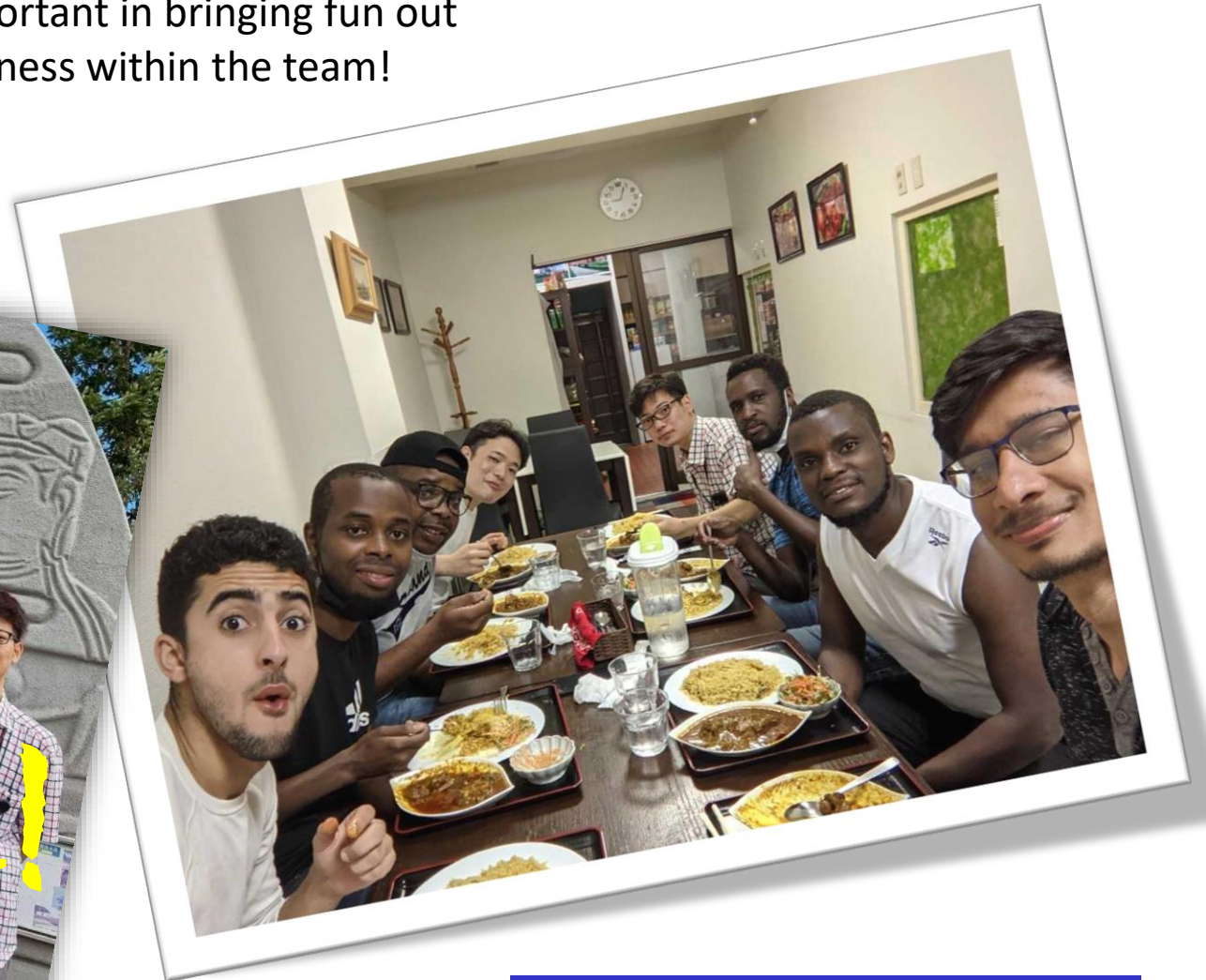
Multi-tasking has been realized from every member of the project because there has been a lot to do in a very short time, with few members.



BIRDS-5 team in photos, during FM stage

BIRDS-5, *What a team!*

The very rare Time-Outs have been very important in bringing fun out of every individual which improved togetherness within the team!

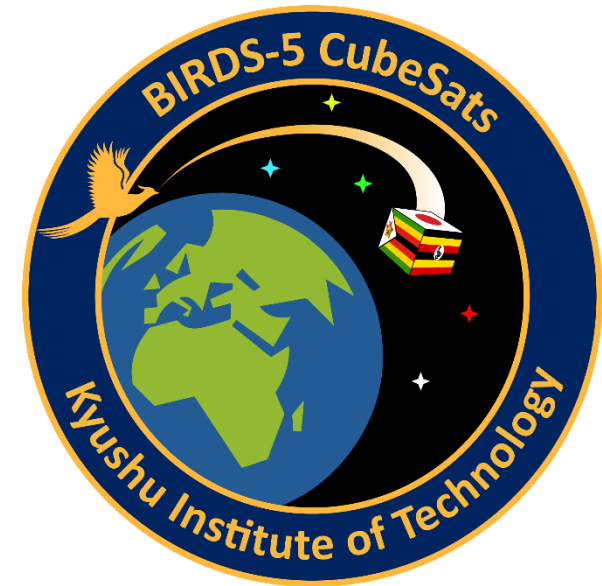


END OF THIS BIRDS-5 ARTICLE

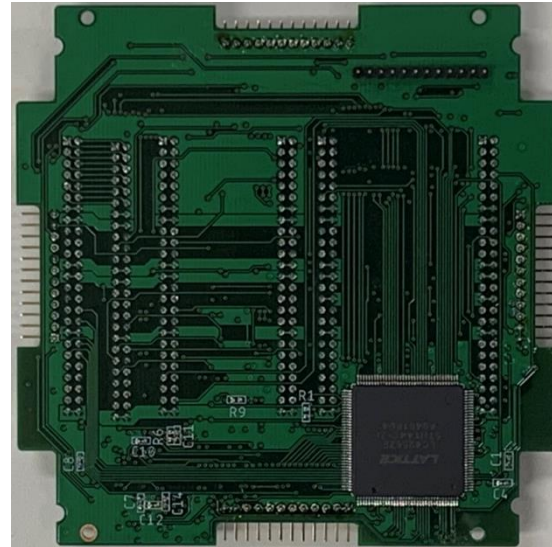
OBC



By : Yukihiisa Otani
April 11, 2022

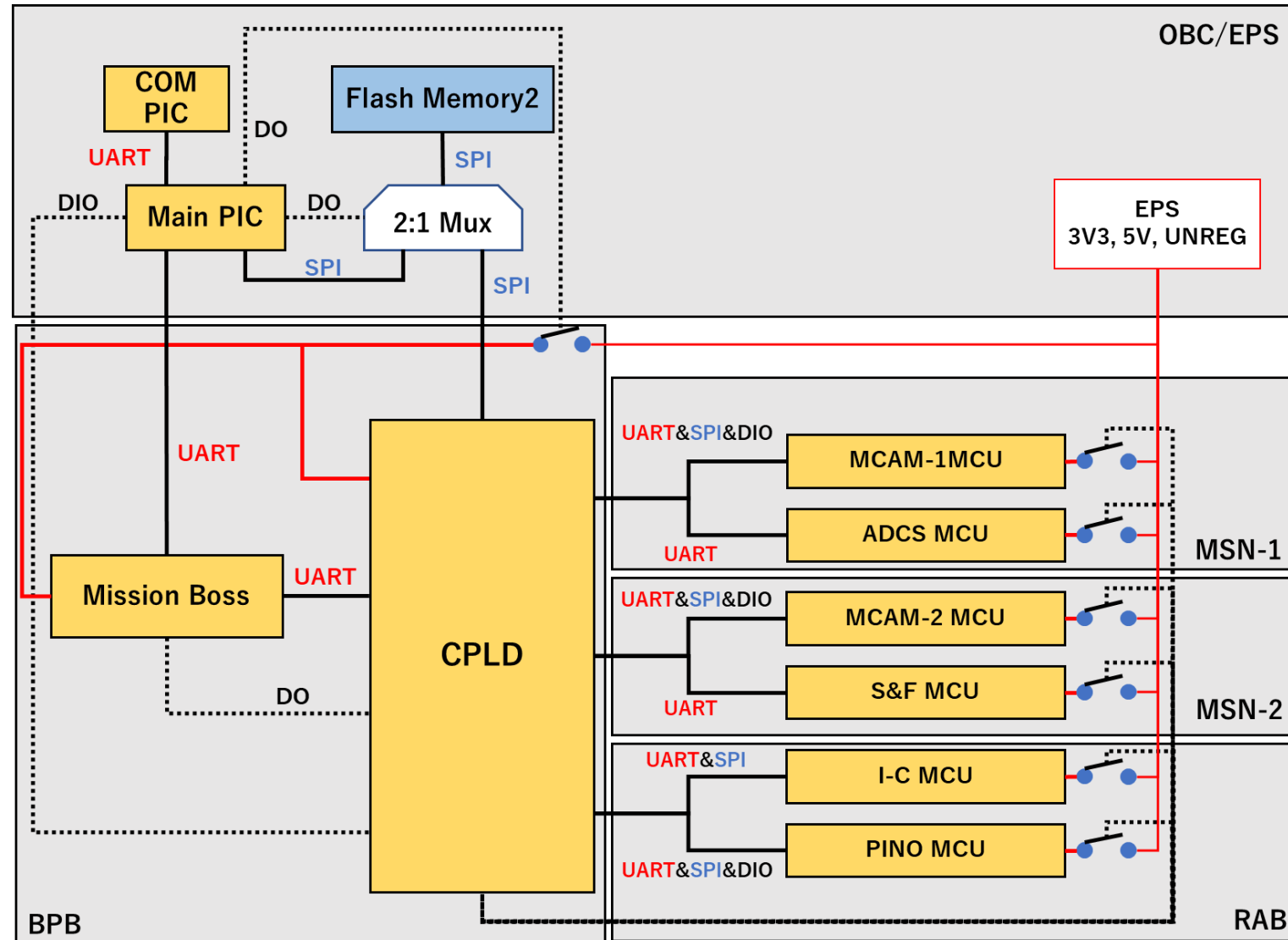


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BIRDS Project Newsletter – No. 75

- Main PIC handles the power switch for the components on BPB
- One of the UART ports on the Main PIC connects the Mission Boss
- All of SPI lines for Flash Memory 2 connects the CPLD
- Mission Boss changes some DO lines and switches the CPLD connection



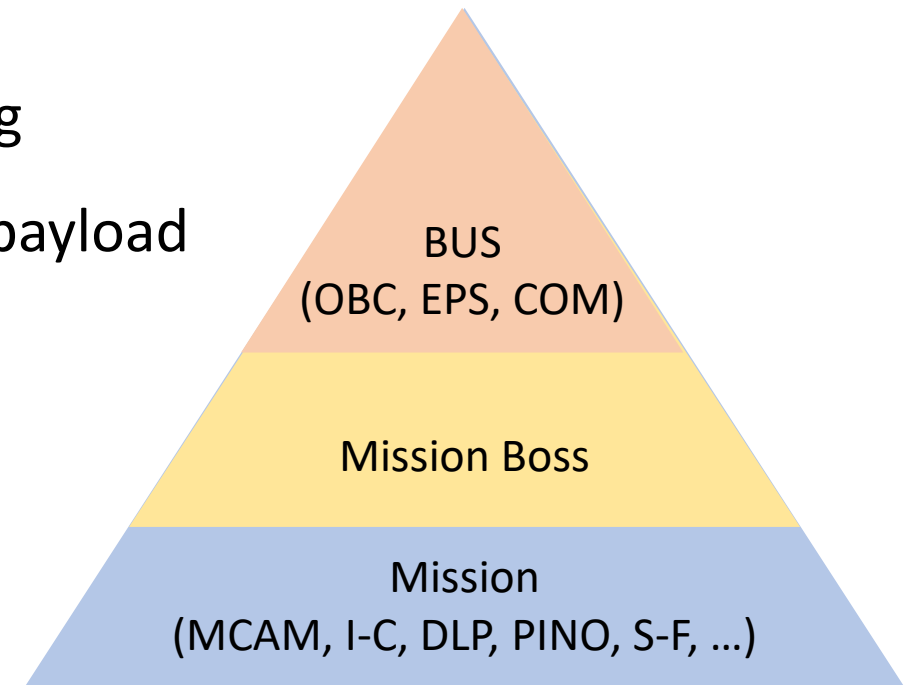
Picture2. Back Plane

Role

1. Control the switch for each mission power
2. Control the switch for each mission data transferring
3. Transfer the command from bus system to mission payload

Benefit

1. Keep the existing code on bus system
2. Distinguish bus system to mission payload
3. Make the system hierarchy clear and simple
4. Decrease the amount of Main code and task



Picture3. System hierarchy

1. Changing the routs

→CPLD likes the switch rail for the train.

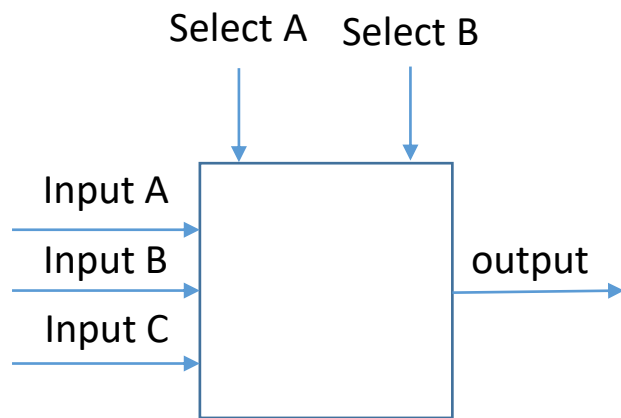
The developer can assign the output pin where the internal signal goes.

Even if the Mission Board pin assignment is changed, we would need not change the BPB and the other boards design.



Picture4. CPLD routing function

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



Select A	0	1	0	1
Select B	0	0	1	1
Output	Input A	Input B	Input C	X

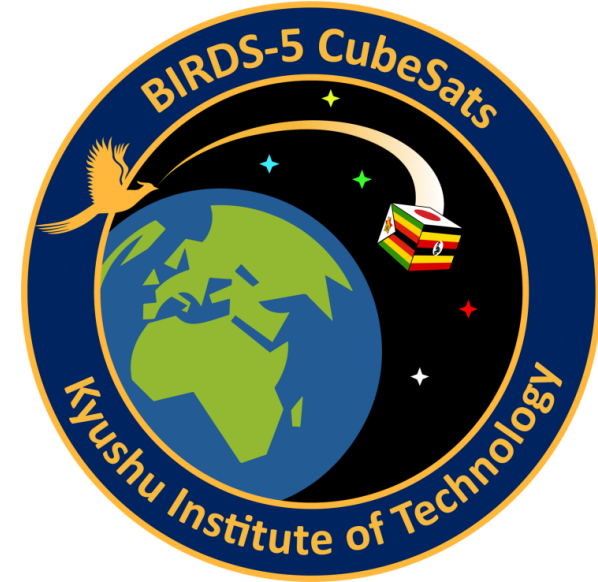
Picture5. CPLD routing function

Table1. BIRDS-5 BPB function check

Test detail	Result
Main PIC can handle the power switch for CPLD and Mission Boss	Successful
Mission Boss can analyze the command from Main PIC	Successful
Mission Boss can change the CPLD routing and handle the power switch for mission MCUs	Successful
CPLD can switches the lines correctly	Successful
BPB layout fits the structure	Successful

END OF THIS BIRDS-5 ARTICLE

30. BIRDS-5: Summary of my Participation in BIRDS-5 Project (Ramson)



By : Ramson Nyamukondiwa

Date: 11/APR/2022

(seated at the table)

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

Communication Subsystem



Technical Achievements

- Leader of the Subsystem
- Structure and function of satellite communication subsystem
- Coding of the subsystem
- Troubleshooting of technical faults
- Communication Tests
 - Functional test of the subsystem
 - Comms test using Shield Boxes
 - Short range test
 - Long range test
 - Anechoic chamber test
 - Power consumption test
 - Inhibit effects to comms
- Antenna(UHF and VHF)
 - Antenna design with eagle
 - Antenna calibrations
 - Radiation pattern
 - Test with comms
 - Spectrum Test
- Safety review needed for the subsystem

Store and Forward Mission/APRS-DP and GSTs

Technical Achievements

- Assistant of the subsystem
- Structure and function store and forward mission
- Knowledge of the APRS systems
- GST development
- Coding of the subsystem
- Eagle designs
- Troubleshooting of technical faults
- Communication Tests
 - Functional test of the subsystem
 - Comms test using Shield Boxes
 - Short range test
 - Long range test
 - Anechoic chamber test
 - Power consumption test
 - Spectrum tests



Electrical Subsystem



Technical Achievements

- Assistant of the Subsystem
- Solar panel attachment, soldering and testing
- Deployment screening, making, soldering and testing
- Testing bypass and blocking diode
- Current sensor calibration
- Battery cycle, screening, selection, assembly, charging and discharge
- Dispatch chamber test
- Electrical interface tests
- Inhibit circuits and tests
- FAB coding
- Subsystems power measurements
- Power simulations and inorbit budget
- The component continuity test
- Safety review requirements test

Ground Station experience

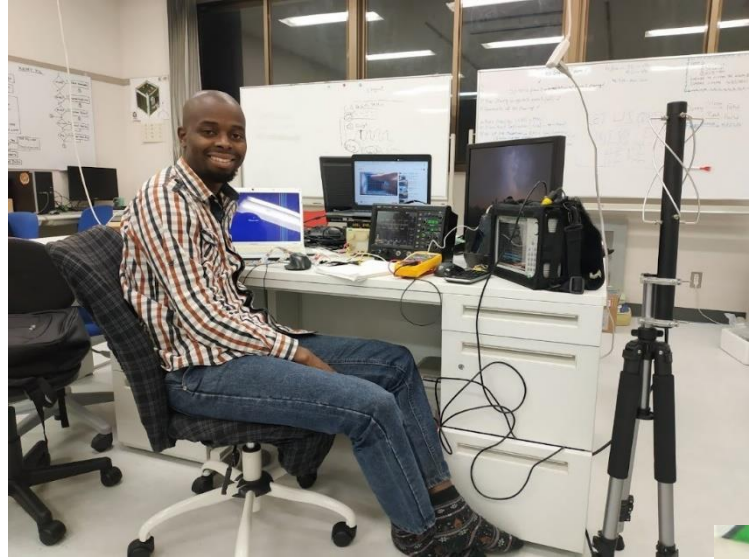


Technical Achievements

- Assistant of the subsystem
- Design, function and testing
- Coding
- Satellite Operation
 - Birds3, 4 and 5
- Training other members
- HAM radio licence
 - Extra Class

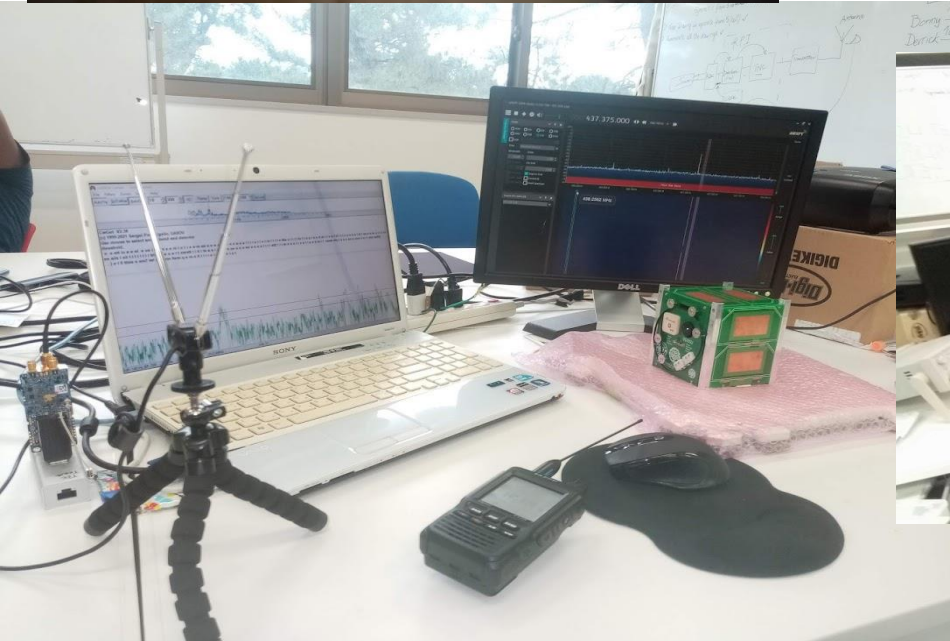


PhD Research Work

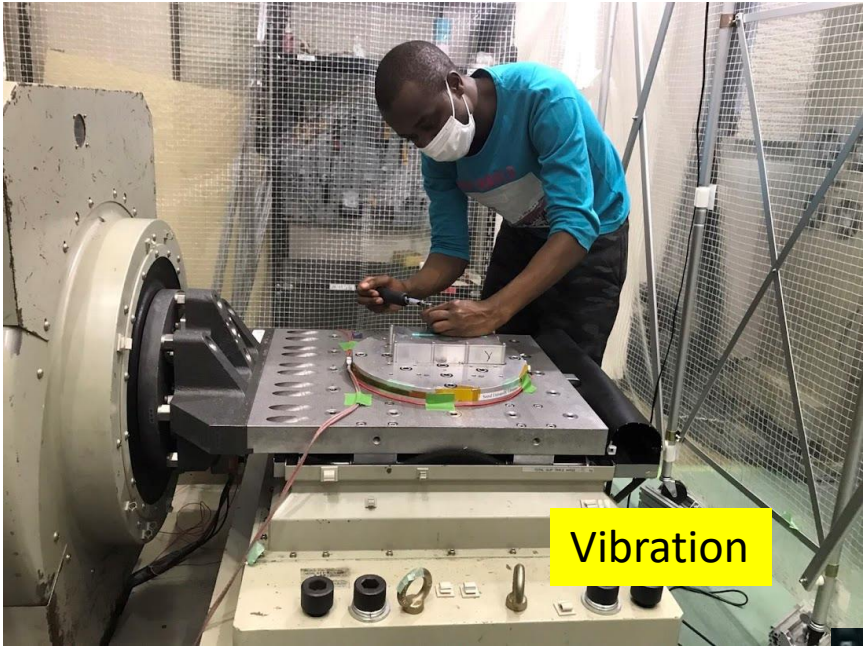


Technical Achievements

- Software Defined Radio for Space Scientific Application
- SDR for space communications



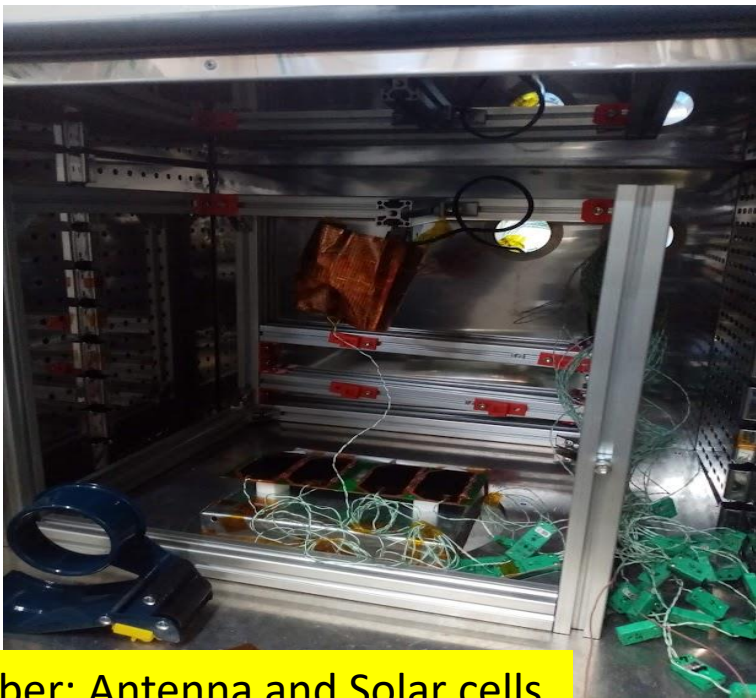
Space Environmental Testing



Vibration



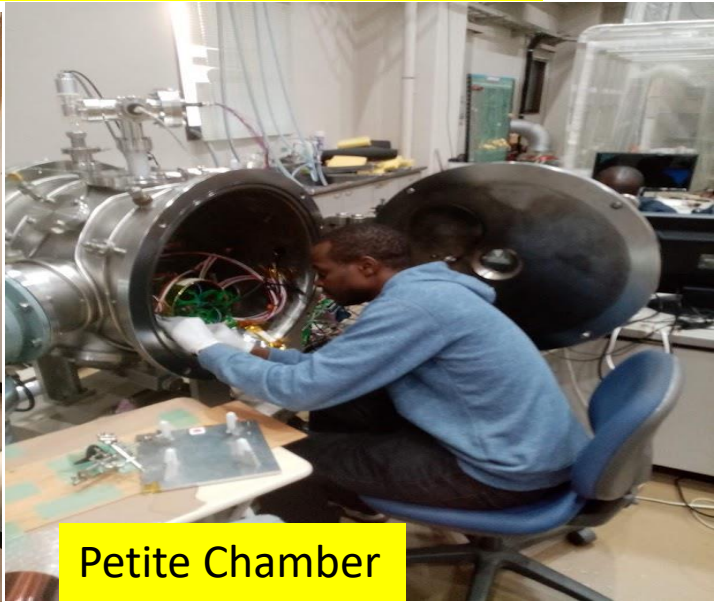
Dispatch Chamber: Antenna and Solar cells



TVT



Anechoic Chamber



Petite Chamber

Get Together with Friends



Lessons

- Creating a network with other people
- We are all created as good people so let's do good always
- Celebrating other peoples achievement: Eng. Hindi, Dr. Femi, Eng. Eyoas, Dr. Yasir Abbas and Eng. Fahd graduations parties
- Touring, playing and taking adventures with team
- Funny photo moments
- Working and assisting other people: Spirit of LOVE and Humanity



Hopes and Dreams for the Future

- Capacity Building in Space development in Zimbabwe and Africa
- Implementation of Space policies
- Membership on Space affiliations
- Membership of our Agency in Space Bodies
- Fostering STEM programs to promote space programs
- Space Outreach
- Lecturer for Space Engineering
- Bring change in my country Zimbabwe and Africa in terms of space activities
- Hopefully Minister of Zimbabwe



Editor's note: *I like the last line. Very cool.*

<https://ja.wikipedia.org/wiki/%E3%82%B8%E3%83%B3%E3%83%90%E3%83%96%E3%82%A8>

Summary of Personal Growth and Benefits from BIRDS-5

Personal Growth	Help of BIRDS-5 to the future
☐ Practical Satellite Engineering Skills ☐ Team leadership skills ☐ Now I can work with tight deadlines and make things happen ☐ To think outside the box ☐ Leant good oral presentation skills ☐ Earned multitasking ability ☐ Developed good collaboration skills with others ☐ Developed excellent communication skills ☐ Gained excellent trouble shooting ☐ Working with some unfriendly people raised my level of tolerance to others ☐ To help and stand for others in difficult times ☐ Always share with colleagues	☐ I gained confidence to work in any satellite project ☐ Became an Engineer with critical thinking ☐ I can be a good leader ☐ I will get things done in time ☐ To participate and work on successful projects ☐ Deduce the root cause of a problem (Fault Tree Analysis) ☐ More satellites to be developed for my country ☐ More people to be trained on satellite development. ☐ No to use assumptions or think you are dreaming but work with reality

THANK YOU

ありがとうございます。

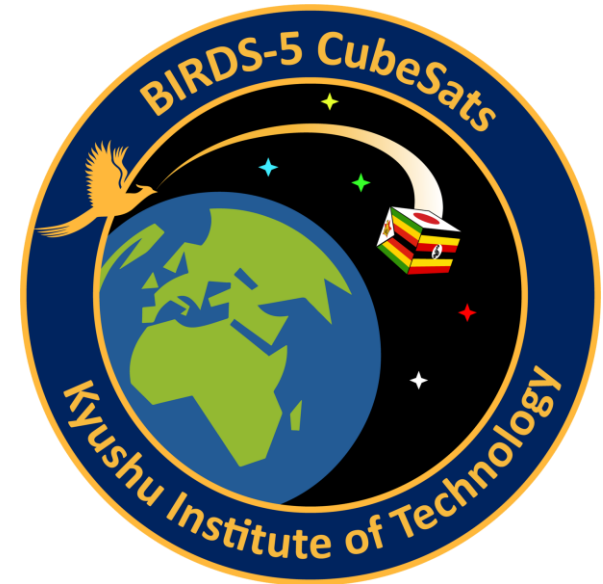
Arigatou gozaimasu.

END OF THIS BIRDS-5 ARTICLE

Summary of my BIRDS-5 experience



By : Fahd MOUMNI
18/04/2022



Introducing my BIRDS-5 experience summary

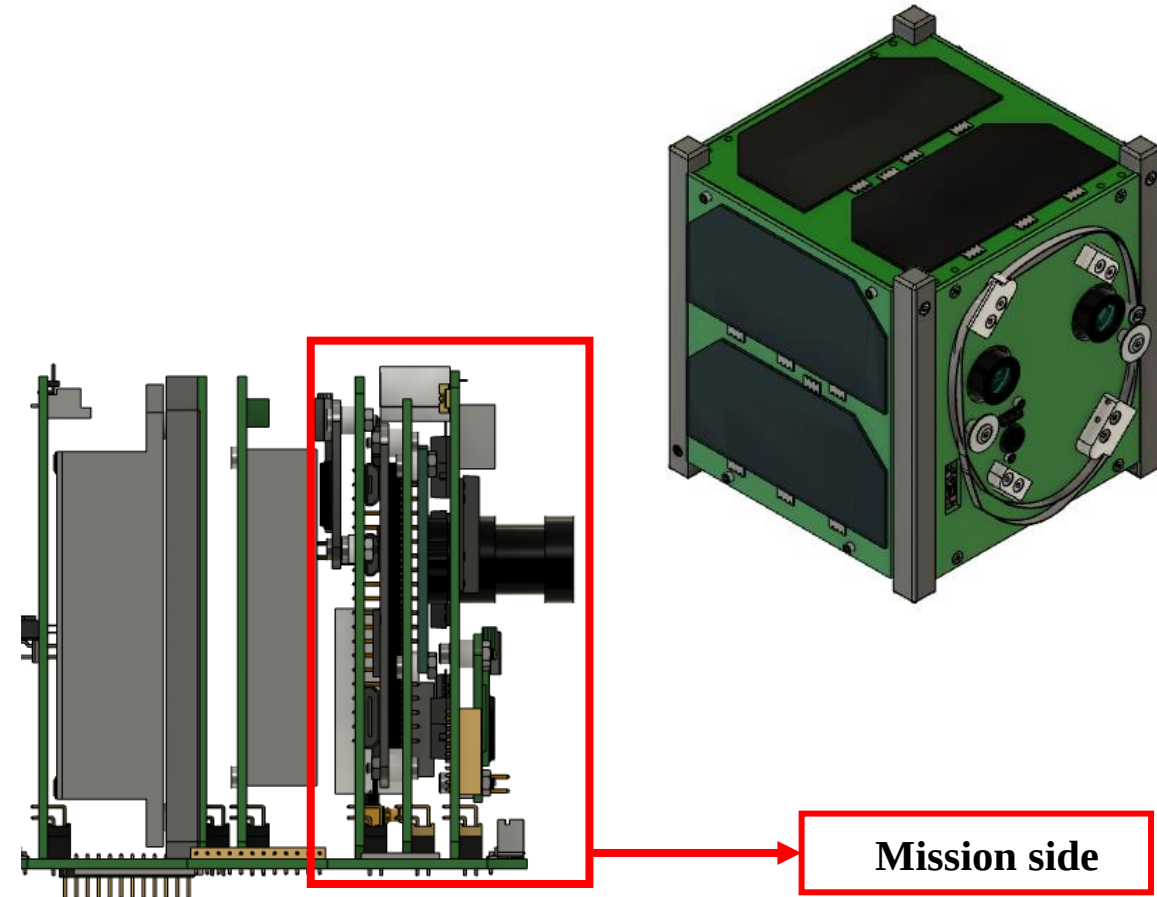
- BIRDS-5 has been the project of a lifetime.
- I have learned technical and non-technical skills that improved me as a person professionally and personally.
- The project started in the middle of 2020 and delivery is planned exactly 2 years later.
- Going through this wonderful experience is something we must share, hence these slides were made to let you know about BIRDS-5 from my perspective.



BIRDS-5 Project Team

Technical work : Structure Design and Assembly

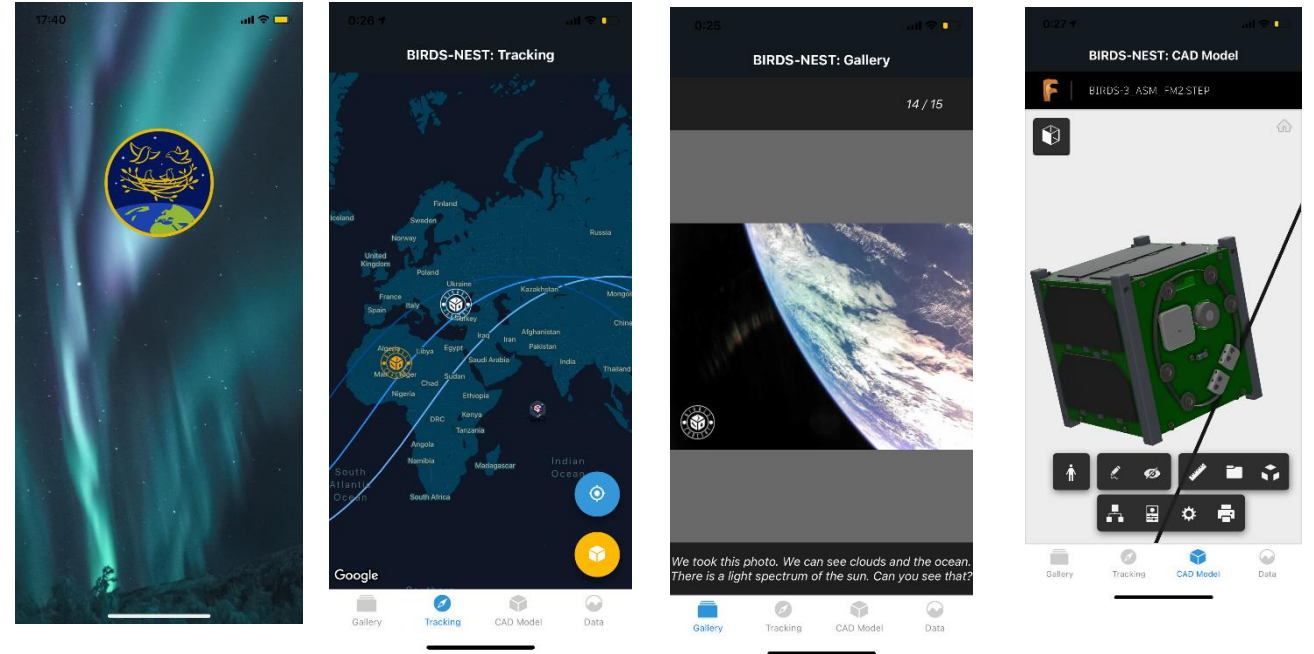
- I have been assigned the leadership of the Structure Subsystem mostly thanks to my motivation to do the task than due to my background in materials engineering and CAD softwares.
- I had the duty of accommodating the internal and external design of the satellite according to the components that each member wanted to use on their mission board.
- The structure also had to be manufactured so blueprints were required and assembly had to be done.
- The structure of the satellites must comply with the safety requirements given by JAXA in their handbook.



BIRDS-5 has one of the most complex internal structures of all BIRDS projects

Technical work : BIRDS-NEST Phone Application

- Thanks to the so-called PBL (Project Based Learning), I earned the chance to be part of this wonderful project.
- The idea we suggested in the PBL is an app that tracks the BIRDS satellites and gives Realtime information about them.
- The Application is called BIRDS-NEST (NEST = Network for Educational SaTellites) and it was made with the help of Keenan Chatar.
- I was assigned the management of this project which is available for free in Appstore and Playstore.
- ***We have users from all continents of the world !!!***



Screenshots of the BIRDS-NEST Phone App

Technical work : Outreach

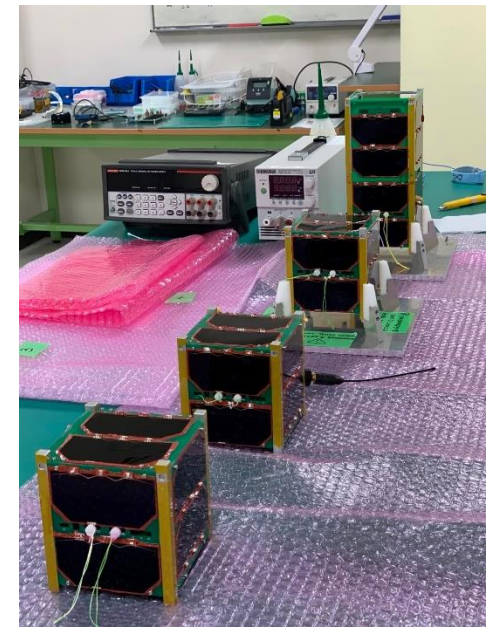
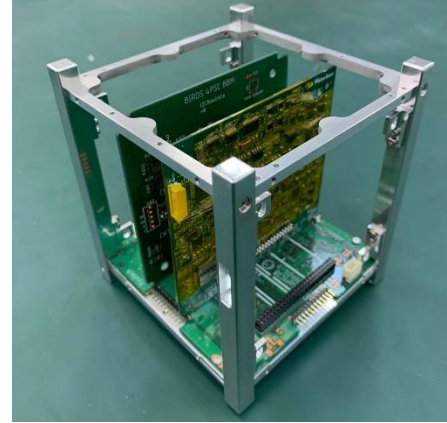
- One of my tasks was to work on the outreach.
- Social media and other platforms have been used for this purpose.
- More than 2000 people followed us on Facebook and some of them even asked to join the Project !!!
- We have a LinkedIn, Facebook, Instagram page and also a website !
- More outreach is obviously expected as the project comes to the delivery stage



The front view of our Facebook page

Technical work : Others

- The general development of a satellite project was unfamiliar to many of us but this is experience allowed us all to have a close approach to the whole process.
- I had the chance to apprehend other subsystems that are inherent to the system, such as the Electrical Power System that one must be aware of as they handle the structure.
- Another example of other technical achievements is the Amateur Radio License Examination that was taken and passed successfully



From EM to FM many improvements had to be provided



After passing the ham license exam with Ramson

Non-technical work : Team work

- “Team work makes the dream work”
- In BIRDS-5 we went from complete strangers to a family with strong bonds.
- The bonds were strengthened thanks to the hardships we overcame altogether with the highest solidarity we could ever think about.
- We have faced many “crazy challenges” and went berserk some times pushing our physical limits to get things achieved.
- Of course none of this could have been possible without a good project manager who knew how to federate us and unite us in hard times.



With BIRDS-5 team we work hard but we also play hard !!

Non-technical work : Deep work

- When I say deep work I mean spending hours and days and weeks until getting that small successful output.
- With BIRDS-5 I have sharpened my ability for staying hours in “the zone”.
- Due to the change of requirements in the mission subsystems, structure design always had to be reupdated from scratch, which was a big challenge.
- But you are going to space !!!! And two whole countries are relying on your motivation !! There is no room for resting all day.
- The reason behind a successful subsystem is not the background of its leader rather it is how much time he or she puts in it !!!



Left picture shows me during the Flight Model Assembly, we spent more than 24 hours for that task, but to do that you must sleep well and eat well like in the **Right picture** where we were getting pizzas during some of those random nights in the lab !

Non-technical work : Management

- Our Project is very particular since it is the only one that started during the pandemic condition and probably will finish as we still have it around.
- Stress was always around but our team is very unique. When a big problem occurs BIRDS-5 members first laugh it out, take a deep breath and bring as much manpower needed as possible to troubleshoot things !
- Getting angry was never an option to solve issues in our project and it was perfect since all challenges were addressed !!!!
- Multitasking is also something that was always encouraged by our Project Manager. Victor always wanted us to learn as much as possible whatever our background was ! I am grateful for that !
- The sense of sacrifice was always there, a member would cover for another one and this again strengthened our bonds more than ever.



Left picture : All team was in the anechoic chamber to understand how to use it



Right picture : I was invited for a delicious Zimbabwean meal with my brother Victor, also our Project Manager

Non-technical work : About Motivation and PR

- On a personal perspective I was driven by the fact that we are making history.
- As an African, being part of the project that will develop and launch the first satellite of two African countries is more than just an accomplishment, it is a dream coming to reality !!
- As a patriotic Moroccan I saw myself doing good not only for my country but the whole African continent. It seems crazy but this is exactly how I saw it !
- Making a space family like this allows us in the future to do tremendous projects for our continent : The usual challenge in big domains is trust. But here is a thing, we already built that trust, now we just need money and we can fly many more BIRDS in the future !! Haha
- Another important thing : BIRDS-5 allowed me to go to the International Astronautical Congress with was a blast ! My life literally changed after that event !



This is how I celebrated my graduation from my Masters, the flags behind, the logo in front, the Moroccan traditional attire, the EM on one hand and my degree in the other

Hopes and Dreams

- As said before, the BIRDS-5 family have shared many strong moments and we have promised ourselves that we shall at least visit each other in each member's country.
- Even beyond that, our friendship will surely become the start of a great collaboration between our countries especially as more than 70% of the members are from emerging countries (65% from Africa).
- The BIRDS-5 project is making the current history of two countries but it is also shaping the endeavors of tomorrow.
- A great advantage we have now is the ability to build capacity with this incredible experience we gathered. Knowledge transfer is now our duty after learning from the world leaders in academic small satellites !



The BIRDS-5 team **family**

Photo Dump



Photo Dump



Photo Dump

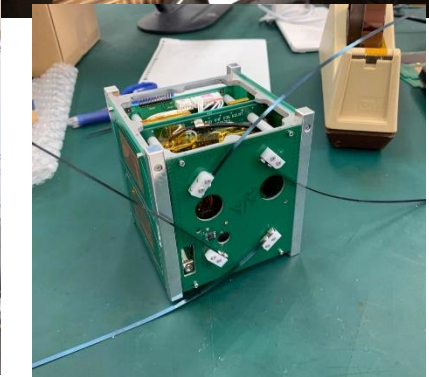
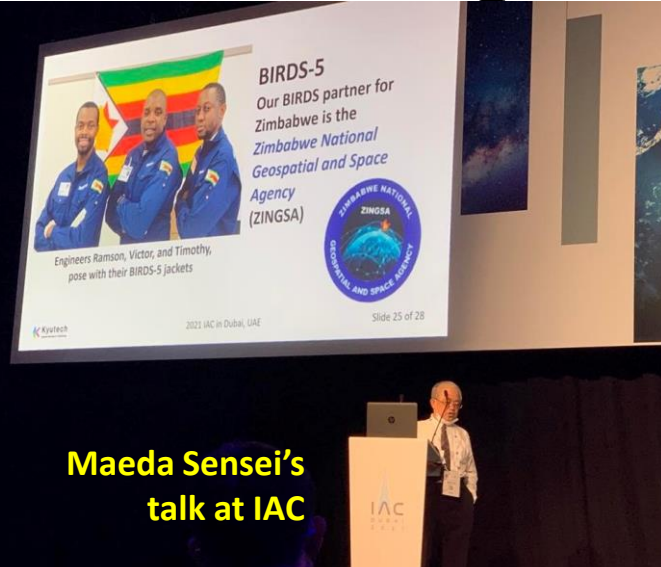


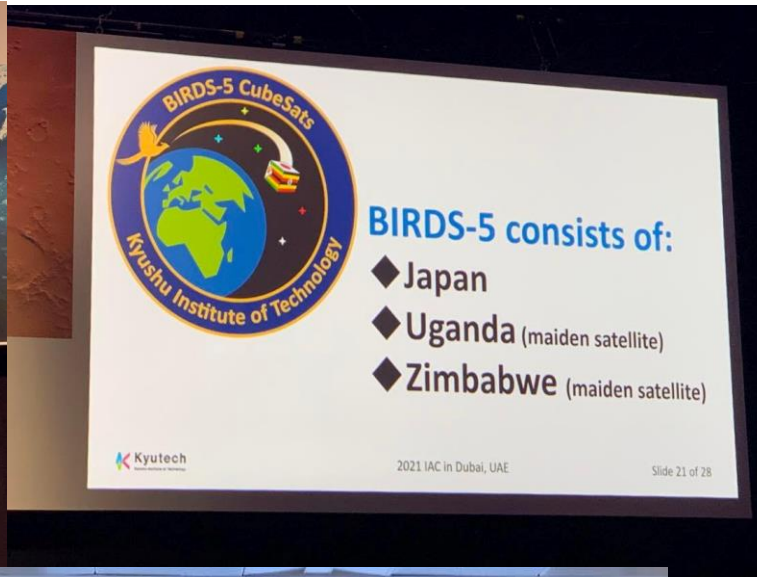
Photo Dump



Photo Dump



Maeda Sensei's
talk at IAC



Prof. Tsuda,
Project Manager
of Hayabusa-2

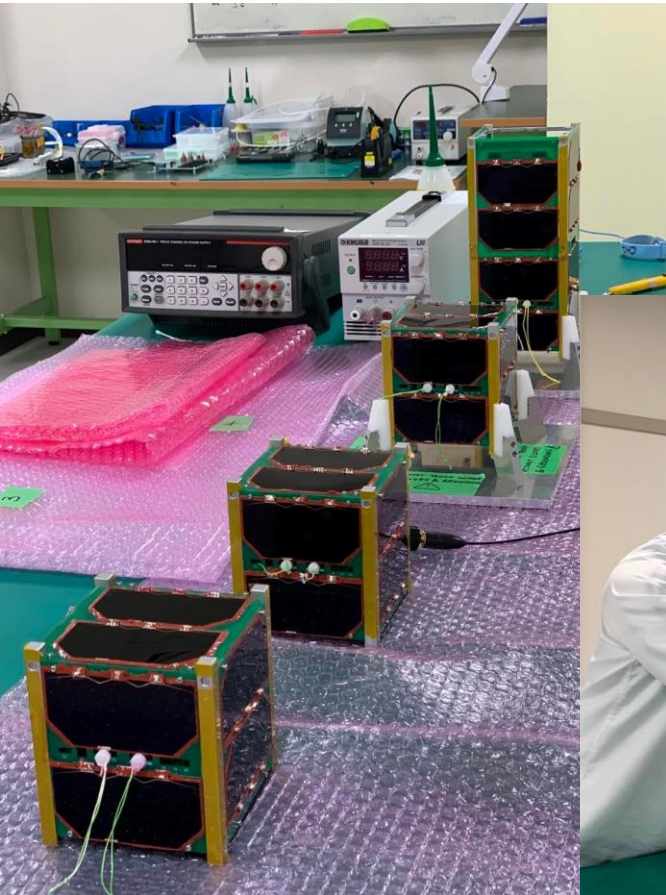
2021
IAC
Dubai→



Photo Dump



Photo Dump



Thank you BIRDS-5 Family

Weebale Bablaadi

Maita Basa Hama

BIRDS-5 を本当にありがとうございました

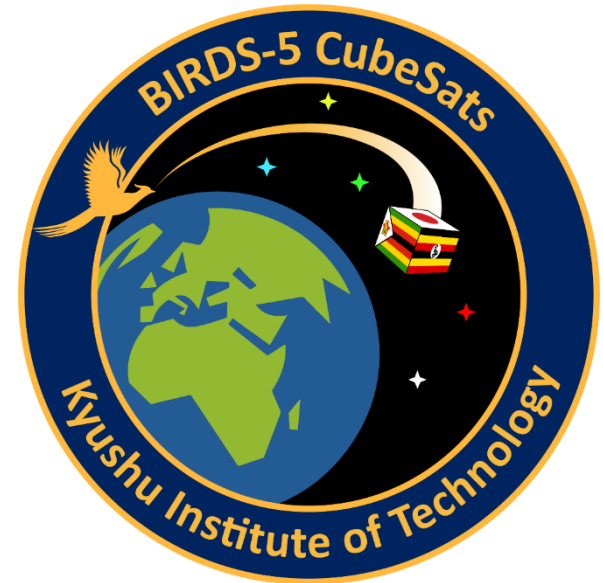
Otsukare sama deshita !

END OF THIS BIRDS-5 ARTICLE

BIRDS-5 project



By : Takashi Oshiro
2022/4

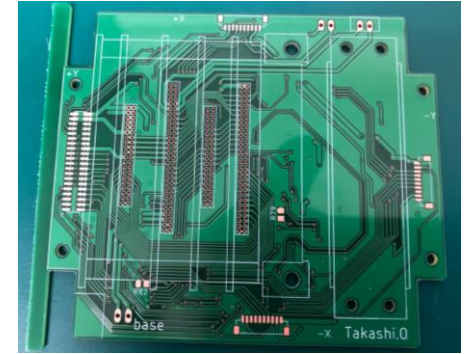
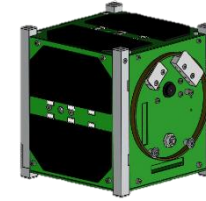


Why I chose structure team

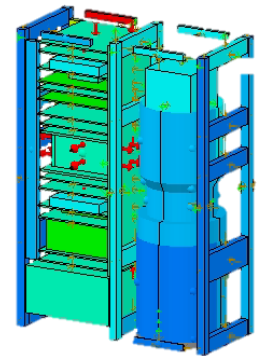
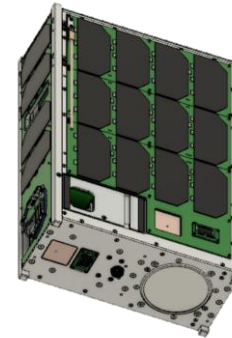
This BIRDS-5 project is 3rd satellite project for me. I learned electrical and thermal engineering before this project.

learning various engineering fields is good for those who create products. It helps a lot during the development because each subsystem is related each other deeply.

Therefore, I chose structure team to find a new perspective of engineering.



Designing electrical interface



Thermal analysis and design

The biggest difficulty

This project is composed by members from 5 different countries. Culture and language is different. In addition, we have faced corona situation since the beginning of the project. Some members couldn't come to Japan, and meetings were held online mostly. For Japanese member, we originally had a disadvantage with English ability. It was one of difficulty because we can not see their reaction, and also we can not use body language to make someone understand.

But of course, learning different cultures and languages was great. We sometimes greet in their words!!



What I have learned in BIRDS-5 project

Technically, I have learned many things about structure. Structure design, analysis, testing, mechanical integration, structure assembly.

Satellites have strict mechanical requirements such as its dimension. They are 0.1mm order. If it can't meet the requirement, we can't bring the satellite to space.

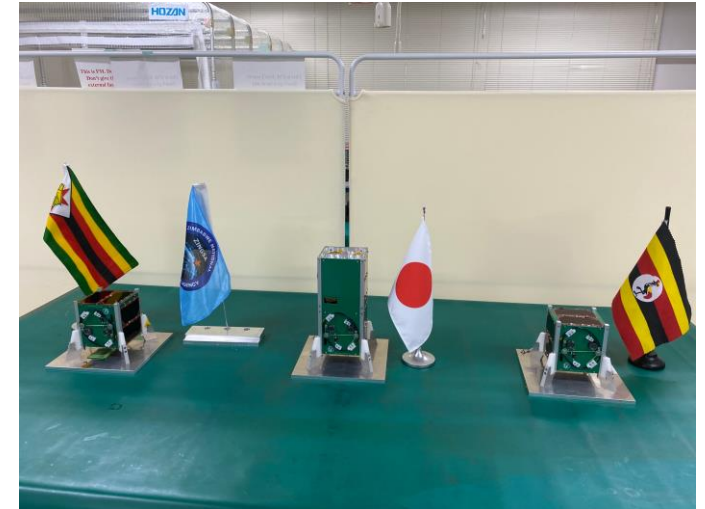


What I have learned in BIRDS-5 project

“Build good relationships with team members and create an environment where it is easy to express opinions to each other”

This is very important when it comes to joining development project.

Each subsystem is closely related to each other, and lack of coordination between team members leads to schedule delays.

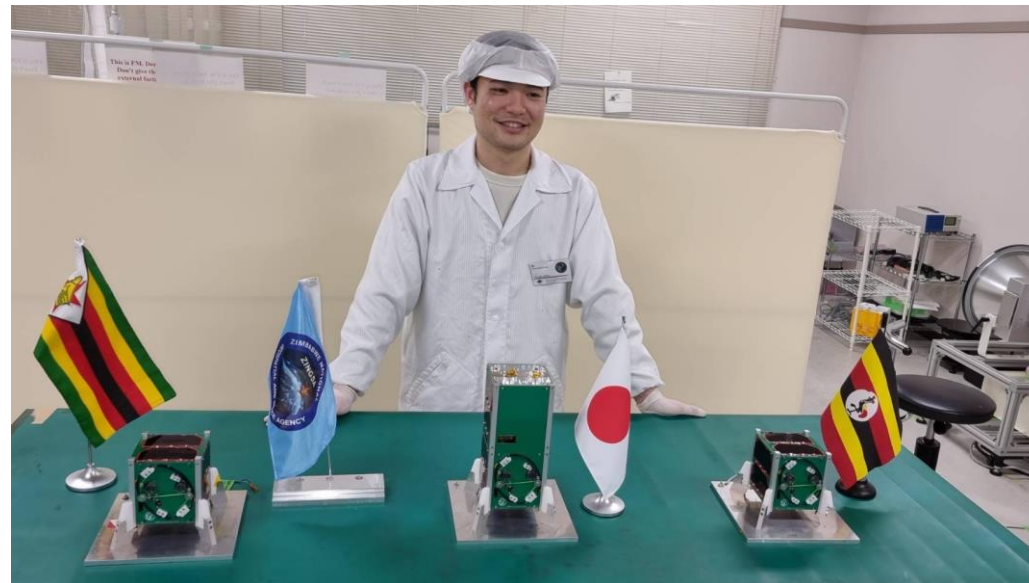
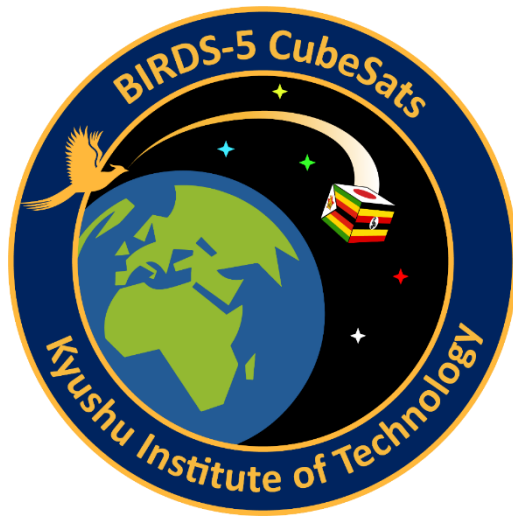


BIRDS-5 FM satellites

The Future

Space industry is growing every year, in several decades, we will be seeing many things which are supported by space technology. Space gives us dream and driving force. I hope my future work will support any of space industry even if it is not direct contribution.

In our laboratory, we experienced not only the research of elemental technology but also the whole process of product manufacturing from conceptual design to development and operation. This experience will be useful in future engineer life.



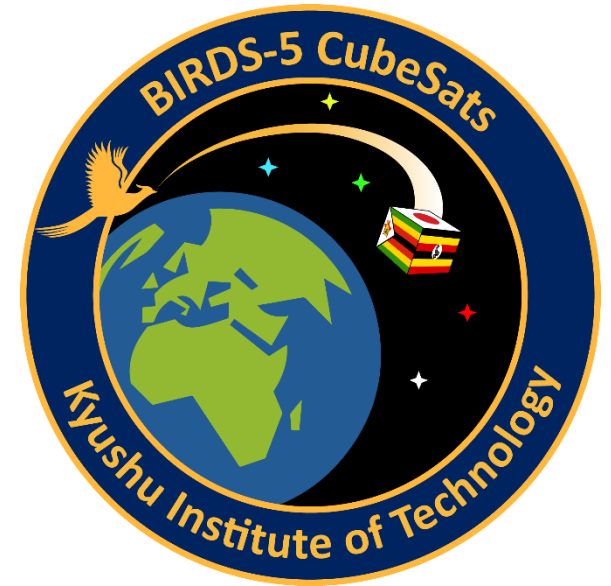
END OF THIS BIRDS-5 ARTICLE

BIRDS-5 Project Experience



By : Timothy Kudzanayi
Kuhamba

Date 10 April 2022



変更時刻	出発地	便名	備考
8:53	東京	FDA301	JAL4401 コードシェア便
9:01	成田	GK503	JAL6045 早着予定
9:05	東京	FDA141	JAL3810 コードシェア便
9:34	関西	APJ153	JAL4403 おくれ
10:00	名古屋/小牧	GK581	JAL6207 早着予定
9:55	名古屋/中部	IBX84	ANA3184 早着予定

They arrived on **JetStar Flight GK503** from Narita (Tokyo). It touched down at Fukuoka Airport at 9:01 AM on Thursday, 2 April 2020.



Timothy Ramson Victor

North Exit of Domestic Terminal of Fukuoka Airport – after a 5-day journey from Harare, *they are happy to be in Kyushu!*

How the journey started

https://birds1.birds-project.com/files/BIRDS_Newsletter_Issue_No.51.pdf



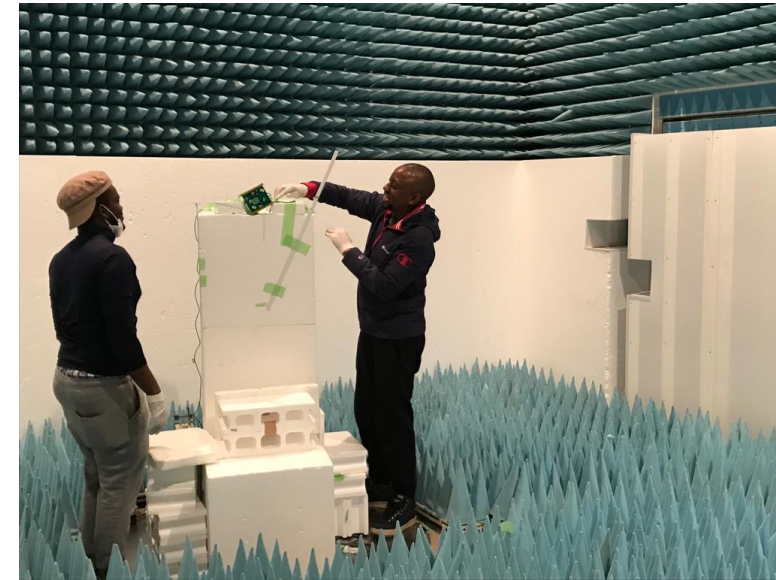
Dream fulfilled 8 Years later



Clean room experience



Permanent magnet attachment



Anechoic chamber

Satellite development requires team work



Cable management is critical at anechoic chamber

Trained on how to test satellites space adaptability using the thermal chambers

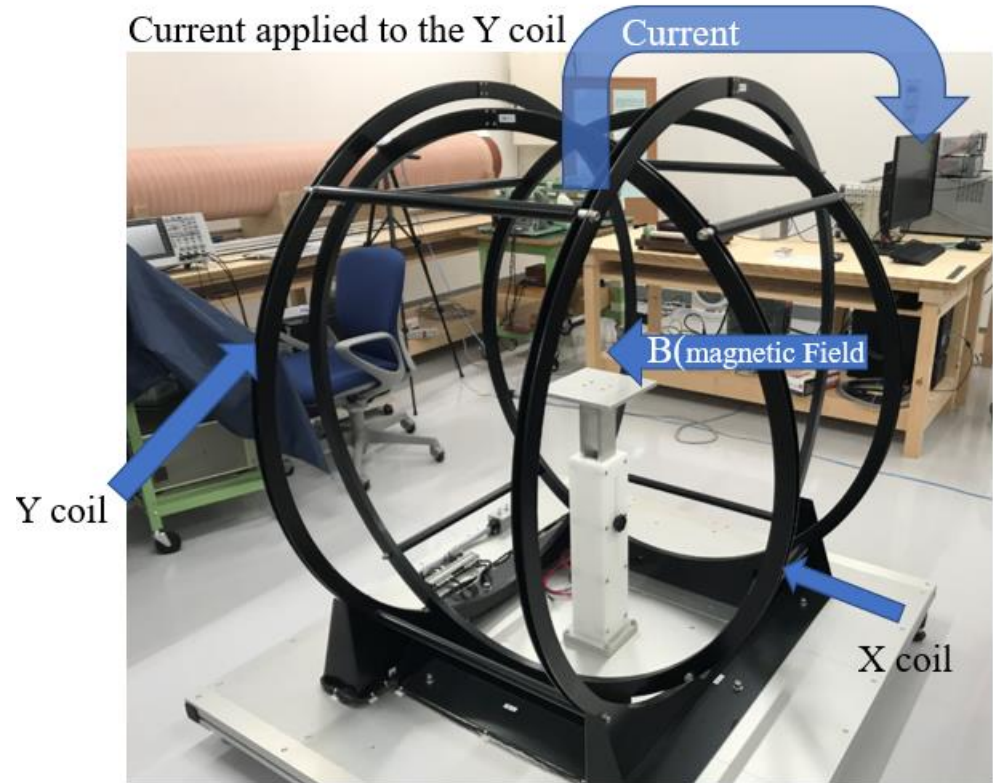


Trained on how to operate the vibration machine for testing the fitness of the satellite before satellite launch

Putting torque marks during BIRDS-5 Vibration test

ADCS Subsystem

- Hysteresis Damper Modelling
- Demonstration of passive system
- Optimisation of the Hysteresis damping of BIRDS 5 satellite
- FM magnetic test
- Magnetometer calibration
- Gyroscope Calibration
- Designing of Attitude Calculator code
- On orbit execution of attitude prediction

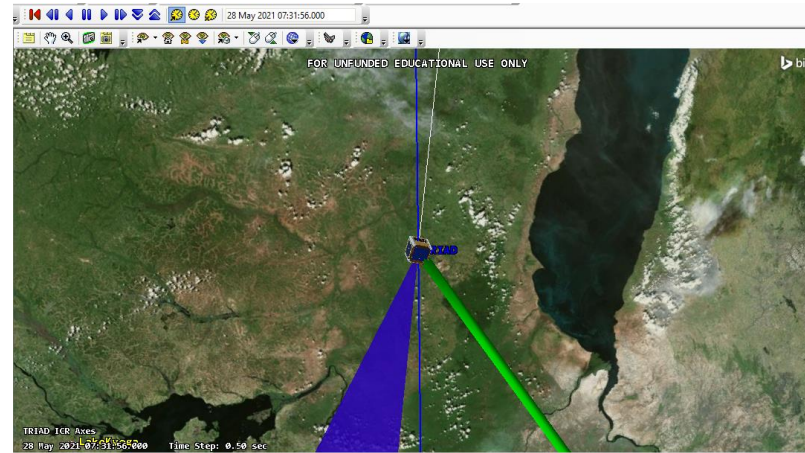


Helmholtz coil used to calibrate magnetometer

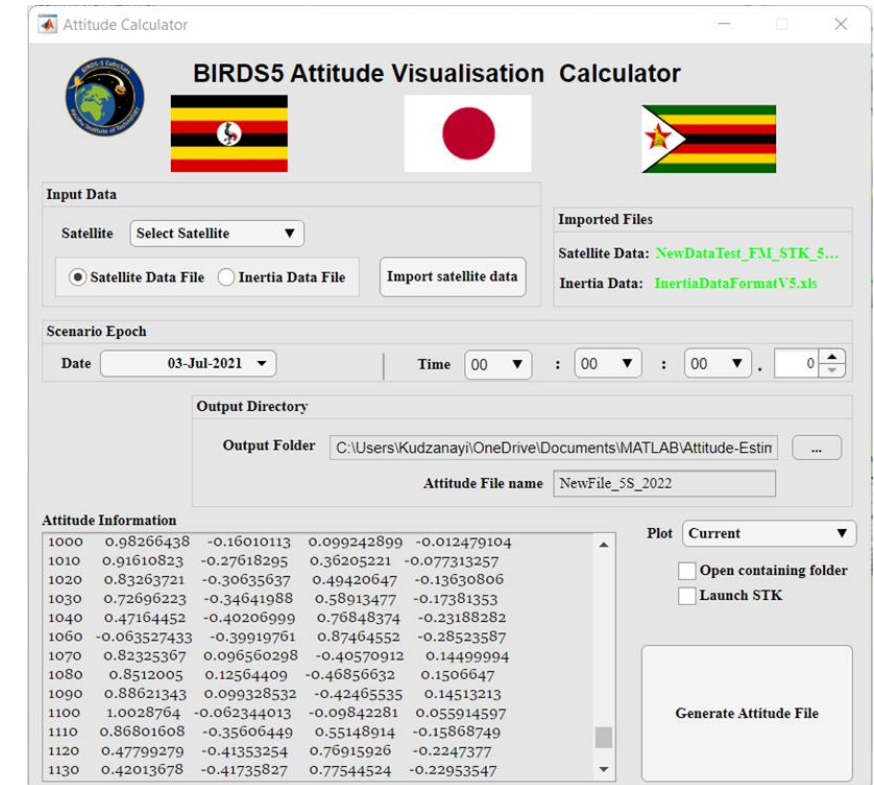
Attitude Visualisation software



Checking conscience of ADCS subsystem data



Snippet of demonstration of attitude prediction software



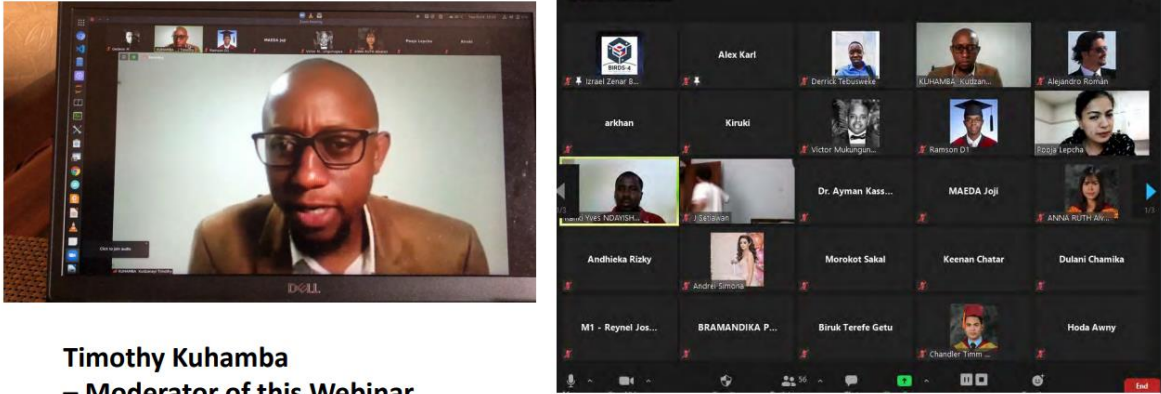
The interface designed for Attitude calculator

Designed and developed attitude prediction software for monitoring the satellite attitude

Kyushu Institute of Technology webinar

Satellites Improve Life

World Space Week OCTOBER 4-10



Timothy Kuhamba
– Moderator of this Webinar

Some of the Participants

BIRDS Project Newsletter – No. 57

Page 101 of 168

Successfully organised and hosted WSW events

[https://birds1.birds-project.com/files/BIRDS Newsletter Issue No.57.pdf](https://birds1.birds-project.com/files/BIRDS_Newsletter_Issue_No.57.pdf)

<https://opportunities.africanews.space/kyushu-institute-of-technology-university-world-space-week-2020-webinar/>

World Space Week 2021

**Successfully organised and
hosted WSW events**



<https://www.youtube.com/watch?v=0d3htPyJp-c>

Also see

◆ **Pages 7-12**

◆ **Pages 32-44**

of Issue 69 of the BIRDS Project Newsletter

https://birds1.birds-project.com/files/BIRDS_Newsletter_Issue_No.69.pdf

Lessons learned

- Systems Integration
- Attitude Determinations and Control
- Application designing with MATLAB and Python
- Embedded systems
- Circuit designing
- Team work
- No excuses (always meet deadline)
- Public relations being Sub-editor of ***BIRDS Project Newsletter***
- Organising and international hosting events

END OF THIS BIRDS-5 ARTICLE

34. BIRDS-5: Ground station update from ZINGSA



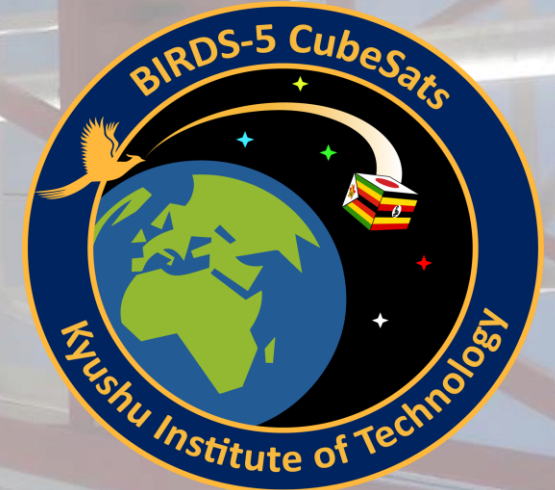
Zimbabwe National Geospatial and Space Agency



Ground Station Progress Brief



By : Tatenda G. S. Marimo
Acting Outreach Officer
24/04/2022



Ground Station Control Room Preparations



The allocated Ground Control Station Room was renovated prior to the installation of requisite amenities, satellite tracking and command equipment.

Ground Station Equipment Installations

A 25-U Rack was installed with all necessary equipment (i.e. TNC and Radio) for ZIMSAT-1 Ground Station Operations.



A Split Unit Conditioned System was Installed to regulate temperature for the Ground Station equipment.



Single Phase AC Clean Power Unit with back up power on standby was mounted to the wall



Finger print
Access Control
installed

Trunking for all outdoor cables was done and the cables were neatly terminated into their respective equipment within the 25-U rack.



Completed Ground Station Control Room

The Control room was fully furnished, equipped and relevant post installation tests/ procedures were carried out. A few faults were identified and subsequently rectified.



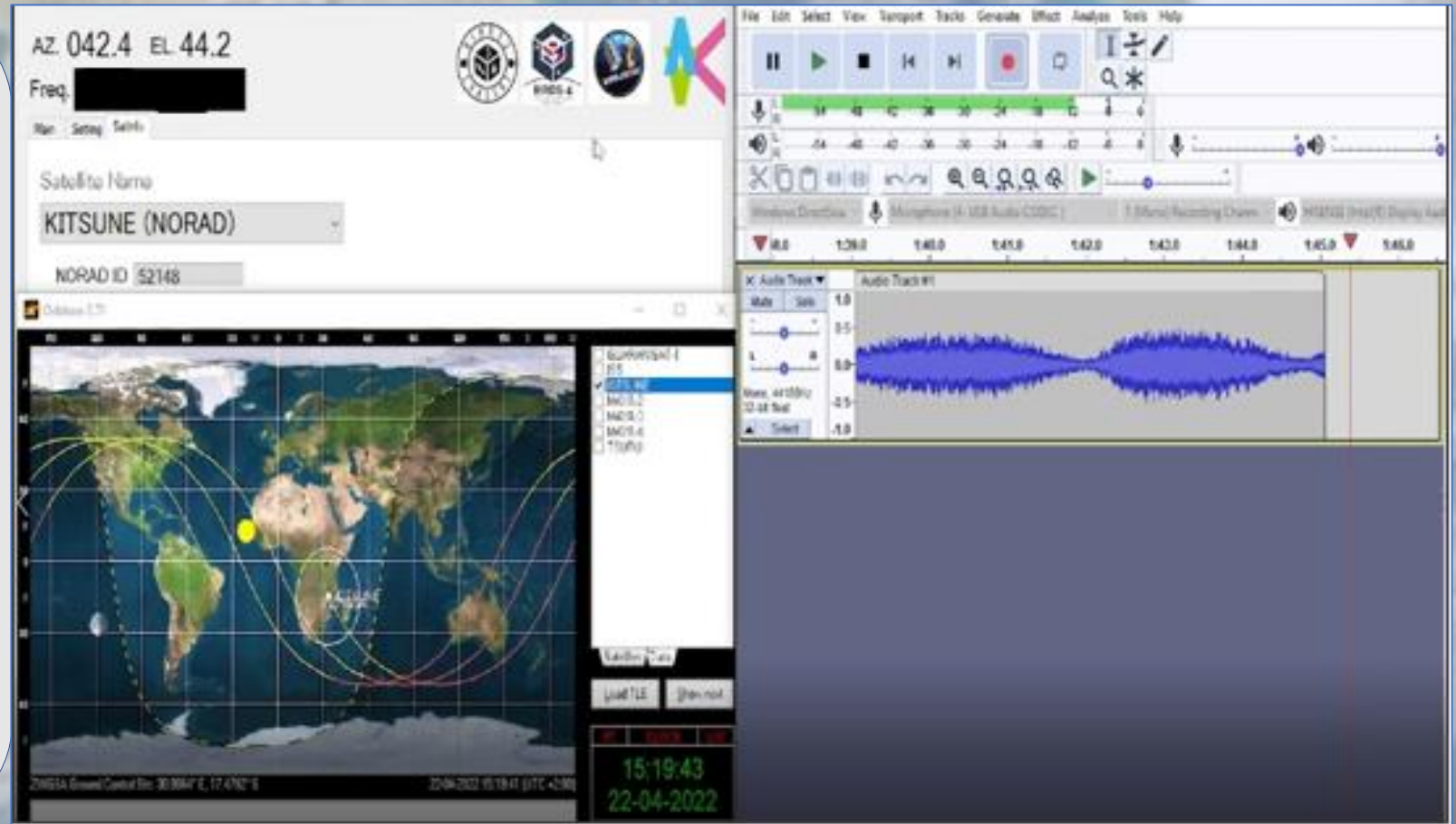
Integrated Equipment Tests

Upon completion of antenna calibrations, azimuth and elevation tests were successfully carried out over a number of days using Rotator Software.



Satellite Tracking of KITSUNE CubeSat

A number of BIRDS satellites were successfully tracked using Zimbabwe's newly established Ground Station. The image on the right shows Kitsune Satellite Track CW Data (Morse Code) Received from the Satellite as it was passing over ZIMSAT-1 Ground Station on 22/02/2022 at 15:19hrs.





THANK YOU!!!



END OF THIS BIRDS-5 ARTICLE

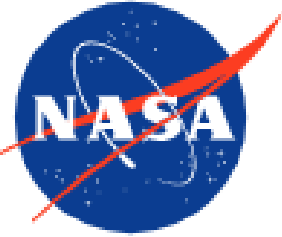
Zimbabwe celebrated its 42nd Independence anniversary on 18 April 2022 in Bulawayo. The above image shows His Excellence The President of The Republic of Zimbabwe Cde ED Mnangagwa lighting the Independence Flame.



End of BIRDS-5 reports



35. BIRDS-4: NASA writes about Paraguay's first satellite



By:
Melissa Gaskill

International Space
Station Program
Research Office
*Johnson Space
Center*



Mar 17, 2021

Paraguay's First Satellite Deployed From the International Space Station



See the entire NASA article:

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

36. Final speaker list for “SEIC Guest Lecture Series” (2021-2022)

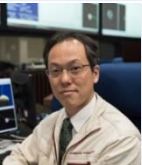
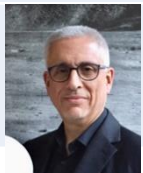


During the 2020-2022 academic years at SEIC, we tried a new guest lecture format because we could not physically invite guest lecturers to Kyutech due to COVID-19. We tried the ZOOM approach. And SEIC management believes that this experiment was a notable success.

On the following pages, you will find the speakers of the 2021-2022 academic year. For the speakers of 2020-2021 academic year, see pages 84-88 of Issue No. 62 of the BIRDS Project Newsletter.

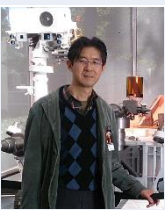
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2021-2022 SEIC Guest Lecture Series -- list of distinguished speakers

No.	Date of lecture, and Photo		Speaker	Country	Affiliation	Title
1	8 April 2021		Les Johnson	USA	NASA Marshall Space Flight Center	Solar Sail Propulsion for Deep Space Exploration
2	15 April 2021		Javier Stober	USA	MIT	Casting Paraffin and Beeswax for In-Space Propulsion Applications
3	27 April 2021		Yuichi Tsuda	Japan	ISAS-JAXA	Hayabusa2 - Sample Return Mission to Asteroid Ryugu
4	12 May 2021		Tatsuya Arai	Japan	Oceaneering Space Systems	Life Support Systems for Spaces
5	20 May 2021		Marco Gómez-Jenkins	Costa Rica	University of Cambridge, UK	Evolution of IoT Satellites
6	26 May 2021		Dmytro "Dima" Faizullin	Ukraine	Institute for Q-shu Pioneers of Space, Inc. (iQPS)	Introduction to Attitude Determination and Control System -- using cases of HORYU-IV and QPS-SAR satellites
7	3 June 2021		Chris Welch	Ukraine	International Space University	The International Space University and the Space Payloads Laboratory

8	10 June 2021		Quentin Verspieren	France	University of Tokyo	A congested, contested and competitive domain: an introduction to safety, sustainability and security challenges in outer space
9	22 June 2021		Rei Kawashima	Japan	UNISEC	UNISEC-Global – Past, Present and Future
10	5 July 2021		Koji Ina	Japan	METI, Government of Japan	Overview of Japan's Space Industry Policy and International Cooperation
11	15 July 2021		Gladys C. Ngetich	Kenya	MIT	Potential Use of Wax-Based Propellants for Propulsion of Small Satellites
12	22 July 2021		Hiroki Akagi	Japan	JAXA	Overview of the International Space Station Program and Japan's Contribution
13	26 July 2021		Arifur Khan	USA	University of Texas El Paso	Space Environment, Satellite Charging and Charge Mitigation
14	2 August 2021		Phongsatorn Saisutjarit	Thailand	International Institute of Space Technology for Economic Development (InSTED)	Waking up to the New Space Economy

15	8 Oct 2021		Kojiro Suzuki	Japan	University of Tokyo	Flight of EGG -- a 3U tiny satellite to open a new era of atmospheric entry	
16	13 Oct 2021		Jyh-Ching Juang	Taiwan	National Cheng Kung University (Taiwan)	Preparing for this wave of space rush	
17	9 Nov 2021		Takao Nakagawa	Japan	ISAS-JAXA	Space cryogenics and beyond	
18	18 Nov 2021		Tatsuya Sawano	Japan	Kanazawa University	The Monitoring of X-ray Transients and Alert Microsatellite KOYOH	
19	29 Nov 2021		Maximilien Berthet	UK-France	University of Tokyo	Measuring the dynamics of the atmosphere for free using nanosatellite TLEs	

20	6 Dec 2021		Chi Nguyen	Vietnam	Caltech (USA)	The Cosmic Infrared Background Experiment 2 (CIBER-2): A Near-Infrared Sounding Rocket Payload to Study Large-Scale Structure Formation
21	7 Jan 2022		T. Nagashima	Japan	Ministry of Foreign Affairs (MOFA)	Space and Diplomacy
22	24 Jan 2022		Takuya Hashimoto	Japan	University of Tsukuba	Prospects for studies of distant Universe with JWST and ALMA
23	2 Feb 2022		Dogacan Su Ozturk	Turkey	University of Alaska	New Insights into the Dynamic Auroral Phenomena
24	8 Feb 2022		Takahiro Iwata	Japan	ISAS-JAXA	Studies of Lunar and Planetary Inner Structures by using Technologies of Space Geodesy
25	25 Feb 2022		Yoshitomo Izura	Japan	GITAI Japan	Can you make money in the New Space industry?

End of this list of speakers

37. JAXA-UNISEC's "J-CUBE" is open for business !!!

Visit the website for full details

<http://unisec.jp/serviceen/j-cube>

Overview of "J-CUBE" program

The Japan Aerospace Exploration Agency ("JAXA") and the University Space Engineering Consortium ("UNISEC") have announced CubeSat deployment opportunity from the International Space Station (ISS) Japanese Experiment Module (Kibo) (JEM Small Satellite Orbital Deployer (J-SSOD)) for domestic universities/college called J-CUBE, based on the MOU about "Comprehensive collaboration agreement on CubeSat release from ISS-Kibo for academic research and capacity building" which UNISEC signed with JAXA on April 1, 2021.

This program aims to realize a sustainable and evolutionary international collaborative structure, build capacity-building system that utilizes the technological capabilities of domestic universities, and keep high popularity and attractivity of Japanese universities as international collaborative partners by enhancement of their satellite development and operation technology. The program has two categories: one is construction of the international collaborative relationships, another is for domestic capacity building. Both categories are open only for UNISEC-Japan's universities, institutes, and technical colleges. The winner can get a fee-based launch opportunity 12U/per year (or 6 satellites/per year) at maximum under this MOU. The satellite size is assumed to be 1~3U.





End of this **BIRDS Project Newsletter**

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

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This newsletter was issued once per month. The main purpose of it was to keep BIRDS stakeholders (the owners of the satellites) informed of project developments.