



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.

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

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BIRDS Project Newsletter

Issue No. 72

(31 Jan 2022)

Edited by:

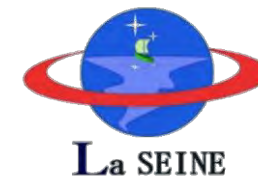
G. Maeda

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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From Philippines

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To all students of BIRDS projects:
Check out the "2022 CubeSat Prize" contest by Arizona State University -- read the details and see if you are eligible to apply. If eligible, then apply. You do not need permission from anyone. The contest article starts on Page 44.

Guest Box (from previous page)

These satellite images show the progressing construction of the Cebu-Cordova Link Expressway. As of May 2021, the construction for the 8.5-km bridge that will connect Cebu City (in mainland Cebu) to Cordova Town (in Mactan island) is 75% done¹.

According to Cebu-Cordova Link Expressway Corp., target completion of the bridge is set by the end of 2021 and will be open to motorists by the first quarter of 2022¹. The groundbreaking ceremony for the Cebu-Cordova Link Expressway was held in March 2017². Both images taken by KOMPSAT-3

References:

¹ <https://cclex.com.ph/updates/>

² <https://cclex.com.ph/cclex-site-inspection/>

Posted in FB by: PEDRO Center, DOST-ASTI, PH

JSPS Reminder

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

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

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



UPDATES FROM THE PHILIPPINES



Philippine
Space
Agency

STAMINA4SPACE

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

Funded by:



Monitored by:



Implemented by:



JANUARY 2022



**Philippine
Space
Agency**

PREPARED BY:

**Public Relations and
Information Division**
Philippine Space Agency

Astronaut Answers Questions from Pinoy Kids



What's your favorite food in space? How do you sleep in space? What does the Earth look like from the International Space Station? These are just some of the fun and interesting questions about space that some intrepid Filipino kids asked Naoko Yamazaki, an astronaut from the Japan Aerospace Exploration Agency (JAXA).

Watch the 3-part series of "Astronaut Answers Questions from Pinoy Kids" here:
<https://philsa.gov.ph/news/astronaut-answers-questions-from-pinoy-kids/>

Philippine Space
Agency

STAMINA4Space
Program

STEP-UP Scholars
Batch 1

STEP-UP Scholars
Batch 2

Wrath of Typhoon Odette as seen from space



During the recent onslaught of typhoon Odette (International name: Rai)– which ravaged parts of Visayas and Mindanao in mid-December 2021– DOST-ASTI, STAMINA4Space, and PhilSA closely monitored the typhoon, and generated maps of the affected areas to provide near real-time data and information to government agencies and the general public.

Read more: <https://philisa.gov.ph/news/philippinesatellitewatch-wrath-of-typhoon-odette-as-seen-from-space/>



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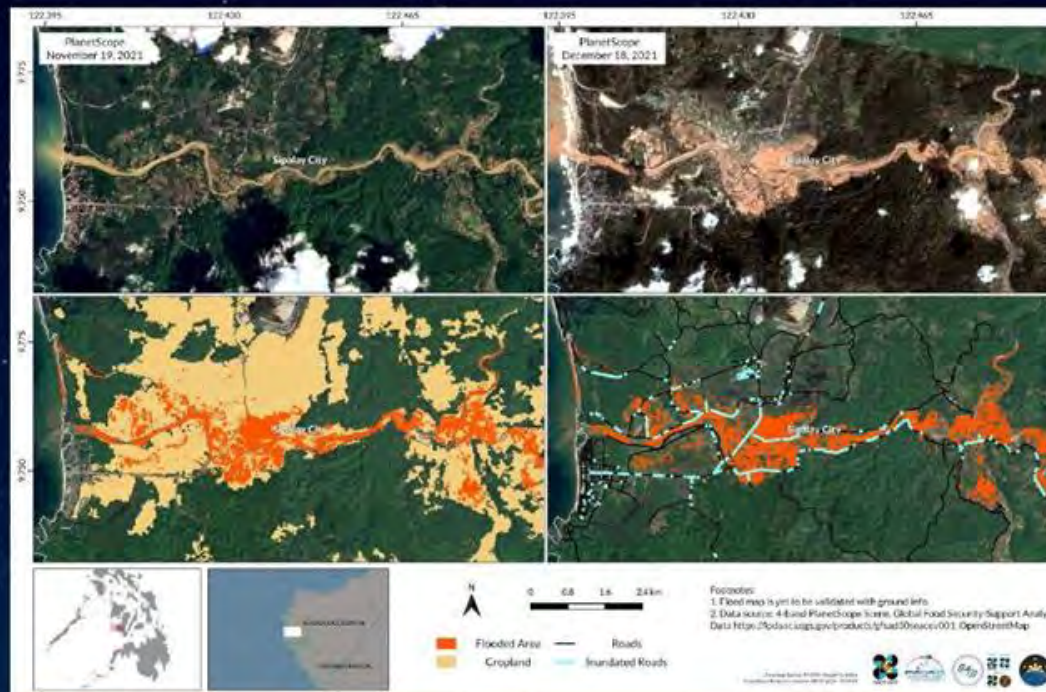
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Effects of Typhoon Odette



The image above is one of the satellite images showing the possible extent of flooding in some areas of Bohol and Negros Occidental following the onset of Typhoon Odette last December. Using a combination of Normalized Difference Water Index (NDWI) and thresholding technique, researchers from STAMINA4Space compared satellite images before the typhoon and images captured December 18, 2021 to estimate flooded croplands provinces.

This satellite image shows possible flooded cropland and roads in Sipalay, Negros Occidental. The post-disaster satellite image was taken by PlanetScope last December 18, 2021. Some 689.5 ha of land was flooded, with 458.8 ha of flooded cropland.

STAMINA4Space researchers used Open Street Map downloaded from Geofabrik for the road networks in the area.

Knowledge Sharing



Photos courtesy of IECEP-Iligan Bay Chapter

Two of our research engineers were resource speakers for the **ELECTRONICS ENGINEERING IN SPACE SCIENCE & TECHNOLOGY** Webinar. The event was organized by the Institute of Electronics Engineers of the Philippines - Iligan Bay Chapter (IECEP-IBC) in partnership with Mindanao State University - Iligan Institute of Technology (MSU-IIT).



Photos courtesy of DOST PCIEERD

The LAVOXA Group of Publications featured one of the STeP-UP scholars, Judiel Reyes, on his and the team's journey in developing the Maya-3 and Maya-4 cube satellites. Read here: <http://bit.ly/3UJG0G3>

Year-end Activities and Virtual Parties

STAMINA4Space Year-end Meeting



ASP Project Year-end activity



Philippine Space Agency

STAMINA4Space Program

STEP-UP Scholars Batch 1

STEP-UP Scholars Batch 2



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Maya-3 & Maya-4 QSL Cards

Maya-3 and Maya-4 were deployed from ISS about three months ago. Since then, we receive continuous support from the amateur radio community around the world in reception of CW and APRS beacons. As a form of gratitude and appreciation, we started sending out digital copies of QSL cards as we prepare in mailing the physical copy of the cards.

Data Collection Form: <https://tinyurl.com/2p96a8w8>



TO RADIO

Day/Month/Year (UTC):

Time (UTC):

Band: ☐ 145.825 MHz ☐ 437.375 MHz

Mode: ☐ CW Beacon ☐ APRS

More info on Maya-3 & Maya-4:

Thank you for receiving signals from Maya-3. Your continued support is highly appreciated.

@STAMINA4Space
stamina4space-updates

@stamina4space
@STAMINA4Space

Welcome 2022!

The team was able to celebrate the holidays safely with their families in their respective hometowns. The holiday season is indeed a special time for the scholars to reconnect with family especially during the pandemic.

We wish you all a very happy, prosperous, and healthy 2022!!



It's her birthday!!!



Another year has passed. Gladys celebrated her birthday in her home province with her family last January 7. She is a member of the STeP-UP Scholars Batch 1, primarily responsible for the ground station and operations; and design of the APRS payload of Maya-3 and 4.

We wish you good health and a happy life ahead!



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SPACE ENVIRONMENT TEST RESUMPTION



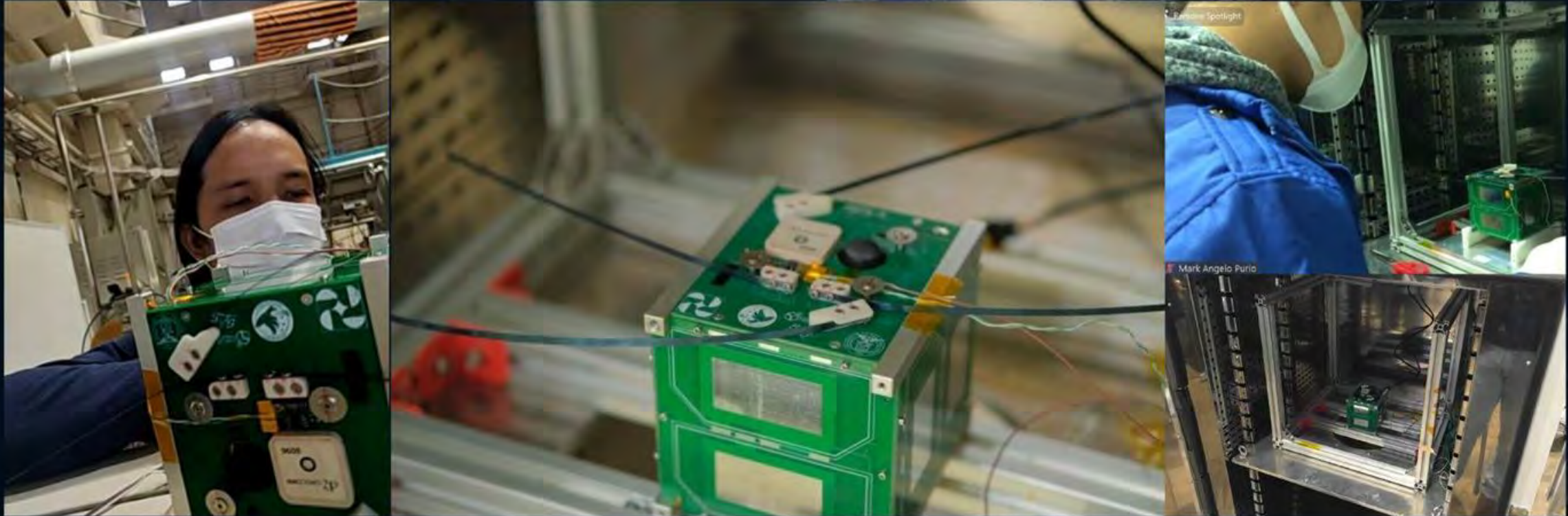
Left: Batch 2 scholars take a group selfie over Zoom with mentor sir Mark Purio during test break time.
Upper right: Maya-6 first antenna deployment success inside the Despatch chamber. Lower right: Batch 2 mentors Hari Shrestha, Mark Purio, and Marloun Sejera double check the thermal vacuum chamber setup.

THERMAL VACUUM TEST



For the Thermal Vacuum Test, functionality tests were performed during the three cycles of cold and hot soaks. These tests are conducted to verify that the cube satellite can still perform even when subjected to extreme temperatures in space. During the preparation and TVT proper, the scholars' mentors also gave demos on how to setup for the tests, and how to properly use the equipment inside the laboratory.

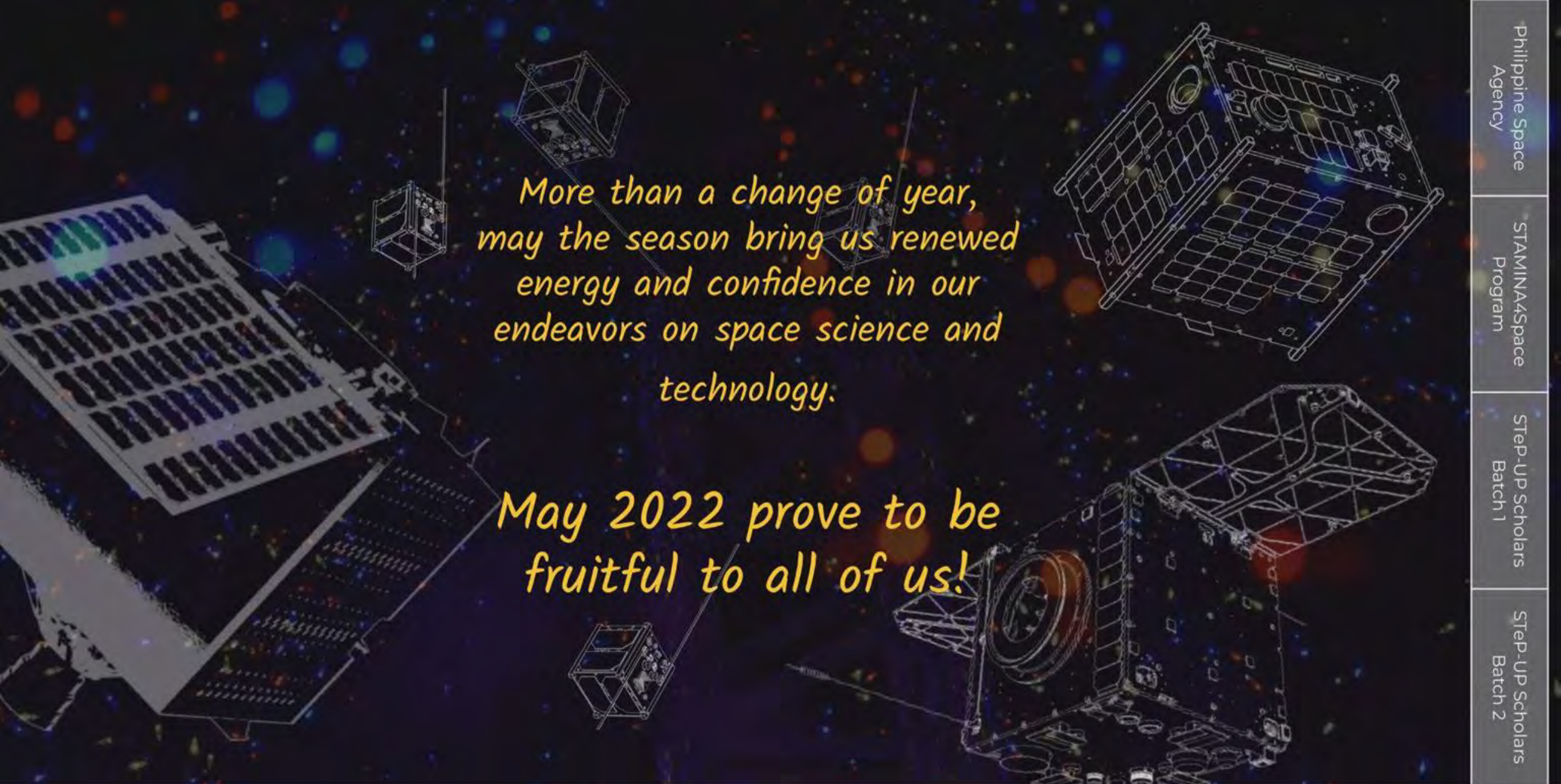
ANTENNA DEPLOYMENT TESTS



After the Thermal Vacuum Tests (TVT), Antenna Deployment Tests are also performed on Maya-6 inside the Despatch chamber. These tests are ongoing, but we currently have a success rate of 3 out of 3 deployments.

HAPPY HOLIDAYS FROM BATCH 2!





*More than a change of year,
may the season bring us renewed
energy and confidence in our
endeavors on space science and
technology.*

*May 2022 prove to be
fruitful to all of us!*



Giulio Mattei is scheduled to join us in April 2022. He provides the following self introduction. He is from Sapienza University of Rome.



Birthday: August 17

Age: 25

Hobbies: Reading, Role-playing games(e.g. Dungeons & Dragons), Watching anime, Travelling

Hi! My name is Giulio Mattei. I was born in Terracina, Italy.
In 2019 I obtained my Bachelor's Degree in «Aerospace Engineering»
at Sapienza University of Rome.
Actually, I am a Master's Degree student in
"Space and Astronautical Engineering" and
I will work on my final Thesis at
Kyushu Institute of Technology.

I am interested in the concept of
"small satellites" and their contribution
in the new space era.

I will stay at Kyutech from April-2022
to the end of September-2022,
as a research student. My academic
advisor is Prof. Cho.



My academic career



I spent the last four years of my academic path at the Faculty of Engineering of La Sapienza University at San Pietro in Vincoli, a former convent. The historic fountain, probably built in the 16th century, is the symbol of the Faculty.

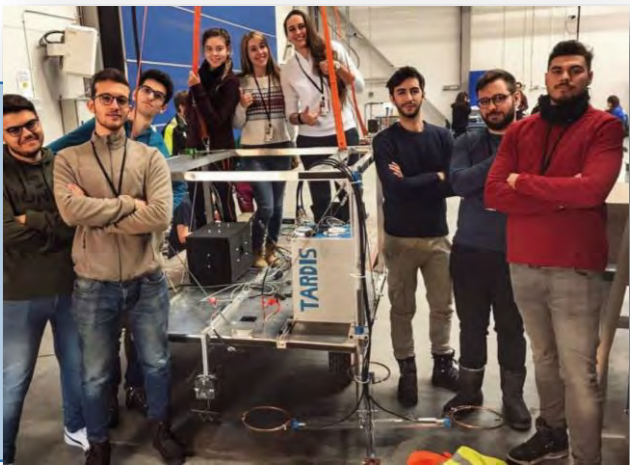
At Sapienza University I received the theoretical basis concerning the design of space systems, but I also had the possibility of gaining an hands-on experience thanks to the presence of academic institutions such as “Sapienza Space Systems and Space Surveillance Laboratory” (S5LAB).



My academic career



In 2019, I participated in the Rexus/Bexus Programme managed by SNSA, DLR and ESA. This experience gave me the opportunity to develop, test and launch a Stratospheric experiment. In the same year I was also involved in the Launch Campaign of the experiment at Esrange Space Center in Kiruna (Sweden).



The team of the TARDIS Experiment (January 2019)



Photo taken during the Launch Campaign (October 2019)

My hobbies



Hiking

(The top of Monte Calvario at 1800 m)

Role-Playing games

(In this photo I was an old wizard)



Travelling

(Photo of the Aurora at Kiruna, Sweden)

Postcards from my home town



View of San Felice Circeo, the “legendary island” in the myth of Ulysses and Circe the sorceress, told in Homer's Odyssey.

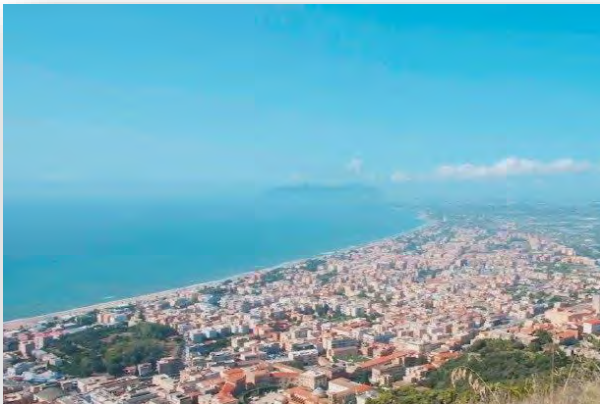


The Temple of Jupiter Anxur is an Ancient Roman temple that was built between the mid-second and mid-first century BC. It is the most important monument of my city.



“The cathedral” is a natural formation resulting from humid karst action. It is located in Campo Soriano, near Terracina.

(https://www.parchilazio.it/schede-1400-sentiero_n_5_campusoriano_monte_cavallo_bianco)



View of my home town and the “Coast of Ulysses”.



“La festa del mare” (Sea festival) is the most important event of my city.



“Tortolo” is a traditional dish prepared during the Eastertime.

Postcards from Rome



The Papal Basilica of Saint Peter in the Vatican, the universal headquarters of the Catholic Church as well as the Pope's residence.



The Colosseum is most iconic symbol of Imperial Rome and it is also listed as one of the New Seven Wonders of the World.



The Mausoleum of Hadrian, usually known as Castel Sant'Angelo at night.



The Vittoriano is regarded as a national symbol of Italy.



"Fontana dei Quattro Fiumi" is an artistic fountain in Rome. It was designed in 1651 by Gian Lorenzo Bernini.



"Cacio e Pepe" is a typical pasta dish from the roman cuisine.

**Thank you
&
see you soon!**



UiTMSAT COLUMN

Column No. 25

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03. Column #25 from Malaysia



UNIVERSITI
TEKNOLOGI
MARA

UiTM Sentiasa Di Hatiku
"UiTM Always in My Heart"

ANOTHER VISIT TO OIL PALM PLANTATION FOR GST INSTALLATION PLAN

IN the previous issue, I have shared about the visit to a fig farm that is exerted by a local agriculture company for a Ground Sensor Terminal (GST) installation plan. This is a collaborative project with a local start-up company. The visit to the fig farm was continued to an oil palm plantation that is located close to the farm in Selangor.

In Malaysia, cultivation of oil palm trees and palm oil production are an essential commodity for economy growth and profit since 1960s. The crop monitoring is a vital step for oil palm fruit bunches harvesting in order to retain the higher productivity. The common measure taken for such monitoring is to scrutinize the

status of biochemical and biophysical properties of the oil palm plants including the content of Chlorophyll in ensuring and determining the healthiness and the level of nutrition requirement of the plants. The monitoring method including the process of crop care are usually performed by the personnel.



Fig. 1: A landscape view of oil palm plantation in Malaysia.
Source: bilaterals.org



Fig. 2: Oil palm trees with fruit bunches ready for harvesting. *Source: Oil Palm Malaysia*

With a goal to complement the existing approach used in monitoring the oil palm trees' health status, GST can be one of the current advancements in compensating the inadequacies especially for large and remote plantation. The oil palm trees require tons of water and sufficient nutrients for growth and production of fruits. By monitoring the level of soil moisture and nutrients in the plantation by the sensor installed in GST, the condition of the trees can be determined and monitored through the satellite technology.

Figure 3 and 4 show the team from UiTM and the representatives of local start-up company visited the oil palm plantation for the GST installation plan. The plantation was observed by the teams in order to see the potential area for ground sensor and GST installations. The size of the plantation, number of trees and their general location, condition of the plantation such as the location of the drainage, and other essential attributes were taken into account during the observation. The needs and demands of the owner of the plantation for the better growth of the trees were also considered to ensure the installation of the ground sensor and the GST succeed and could provide the beneficial data for crop monitoring.



Fig. 3: The visit in the oil palm plantation.



Fig. 4: The oil palm plantation observation for GST installation.



Fig. 5: The discussion was continued by the UiTM team, the representation of the local start-up company, and the owner of the farm after the plantation observation.

**End of Malaysia's
Column**



Fig. 6: The close-up view of one of the oil palm trees at the visited oil palm plantation. In this picture, the oil palm fruit brunches were not mature yet for harvesting.

04. Report from Kenya



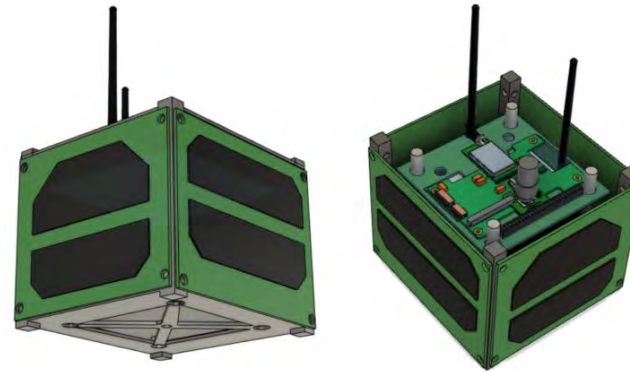
The following report is from Cosmas in Kenya – he was a PNST fellow here at Kyutech. He returned to join the University of Nairobi.

This report is about "*Nano-Satellite Platform for the University of Nairobi (NaSPUoN)*". It entered a competition sponsored by the Kenya Space Agency; the competition is explained.

Happily, his team won this competition. Thus, the space agency selected his team to join a 3U university consortium (the next stage in Kenya).

Nano-Satellite Platform for the University of Nairobi (NaSPUoN)

Capacity-building CubeSat Project at University of Nairobi, Kenya



By

Dr. Mutugi Kiruki

11 Jan. 2022



University of Nairobi

Dept. of Electrical & Information Engineering

Project Background

Funded by **Kenya Space Agency (KSA)** under Nanosatellite Research Grants FY 2020/2021

- 5 Kenyan Universities funded to each develop a **1U Engineering model**
- Kickoff: Oct 2020



Kenya Space Agency @SpaceAgencyKE · Oct 1, 2020

KSA had invited public universities to submit proposals to host Research Chairs in Nanosatellite Development & Operational Space Weather. Ag DG Maj Gen Chepkuto announced the 5 universities that were selected in no particular order; UoN, KU, JKUAT, MOI, TAITA TAVETA & TECHNICAL UNIV

KSA communication on 2020 Awardees



Prof. Muthia receives the grant, Oct 2020

NaSPUoN Team

All from the Faculty of Engineering

Prof. Mwangi Mbuthia – Principal Investigator

Dr. Mutugi Kiruki – Project Manager

Ms. Betsy Mugo - Faculty

Students

- 4 from Dept. of Electrical & Electronics Eng.
- 3 from Dept. of Mechanical & Manufacturing Eng.
- 3 from Dept. of Geospatial & Space Technology



Part of NaSPUoN Team

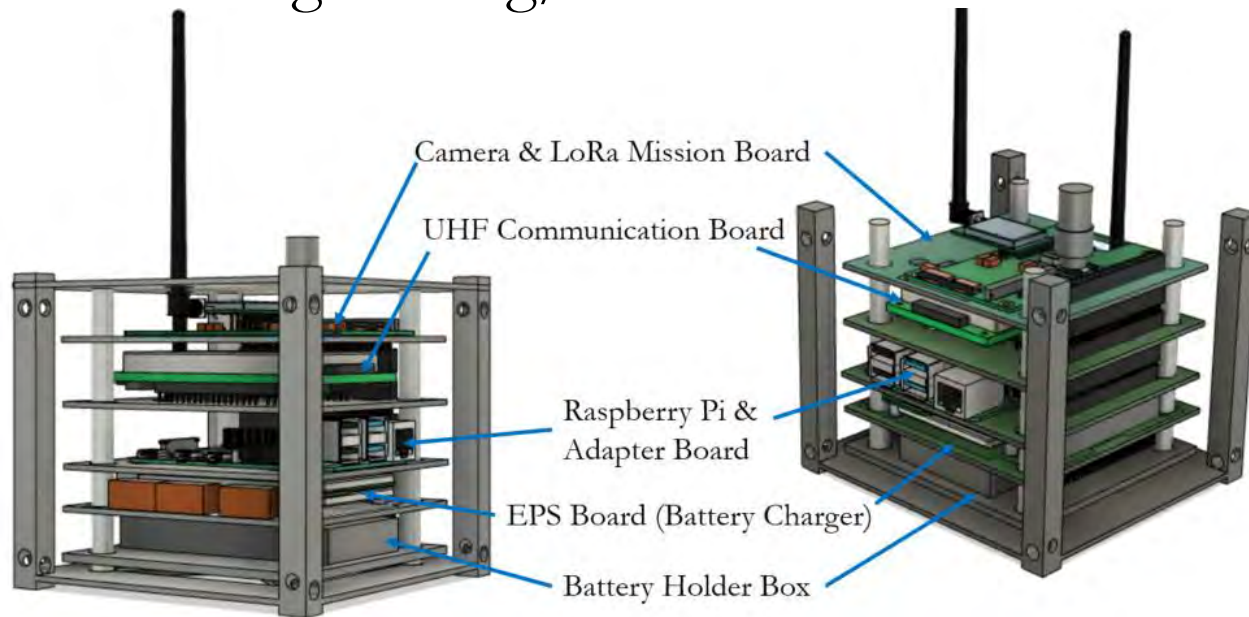
NaSPUoN Development (1/4)

Objectives, Missions & Design Concept

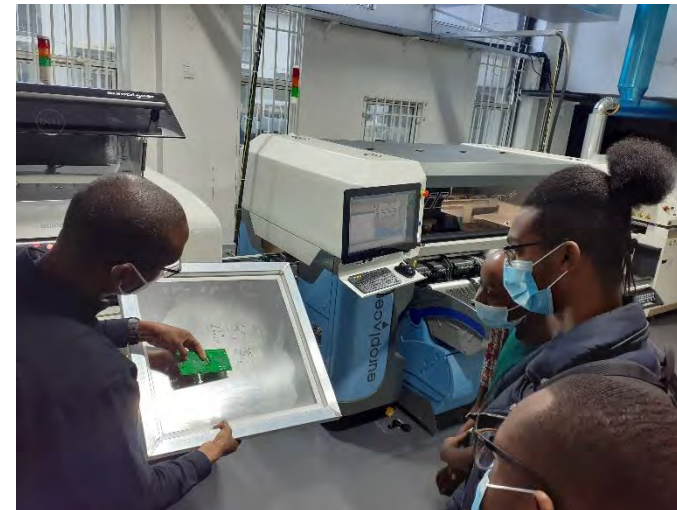
- Undergraduates' exposure to nanosatellites
- Two missions: LoRa and Camera missions
- 1U Engineering/Bench Model

Preparations

- Literature review on missions & subsystems
- Familiarization with software tools
 - PCB design - Eagle
 - Structure design - Solidworks



NaSPUoN Concept



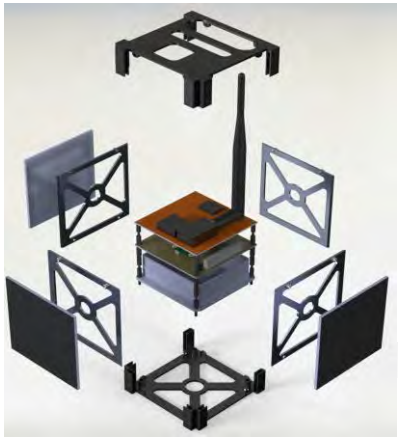
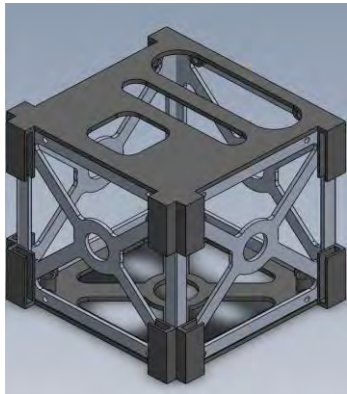
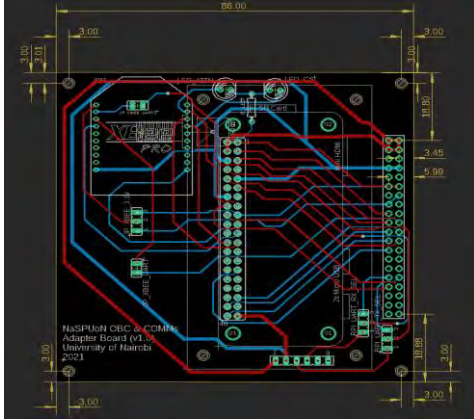
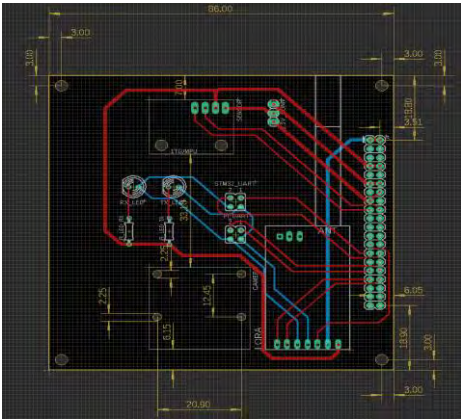
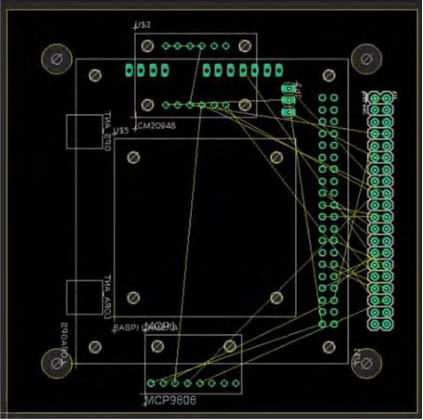
Team visit to local fabrication company

PCB & Structure Designs

NaSPUoN Development (2/4)

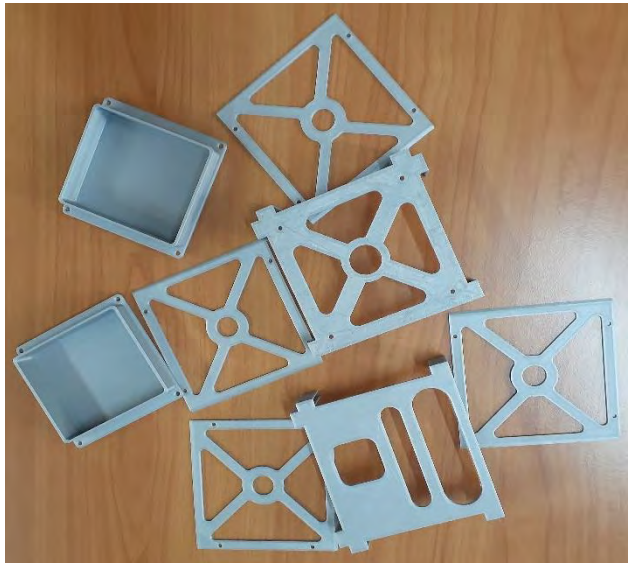
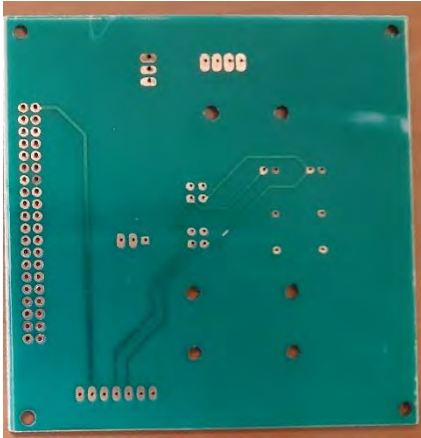
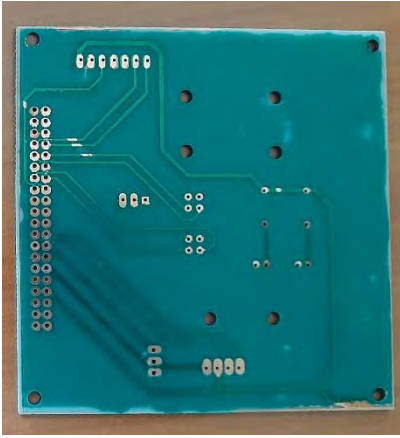
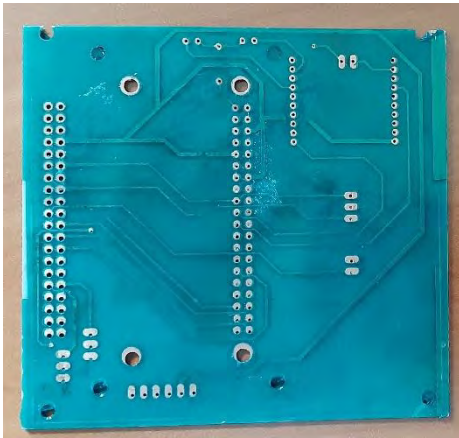
o 3 Boards: EPS, Comm & Mission

o Structure



NaSPUoN Adapter Boards PCB Designs

NaSPUoN Structure Design

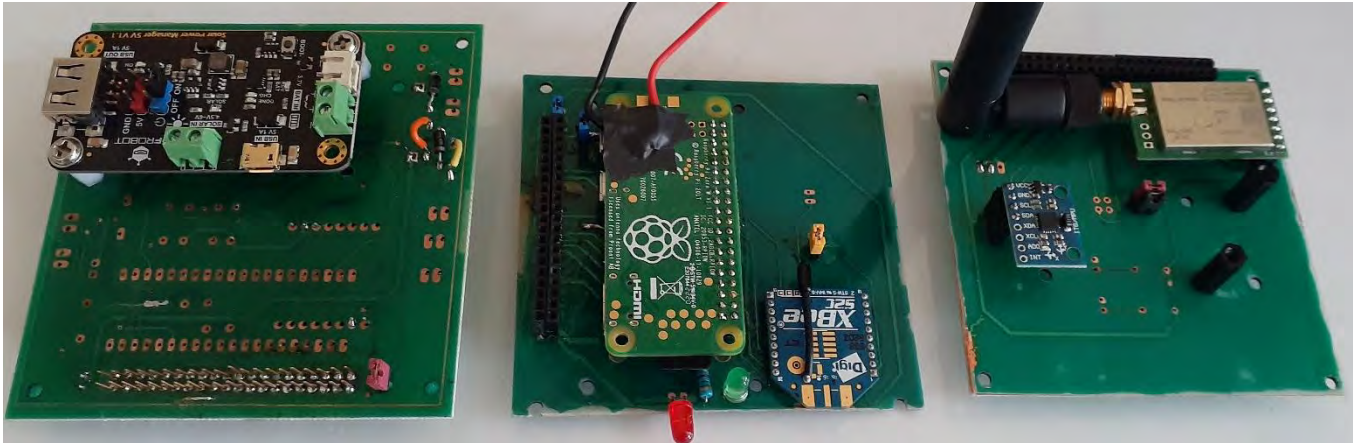


*3D Printed
Structure panels*

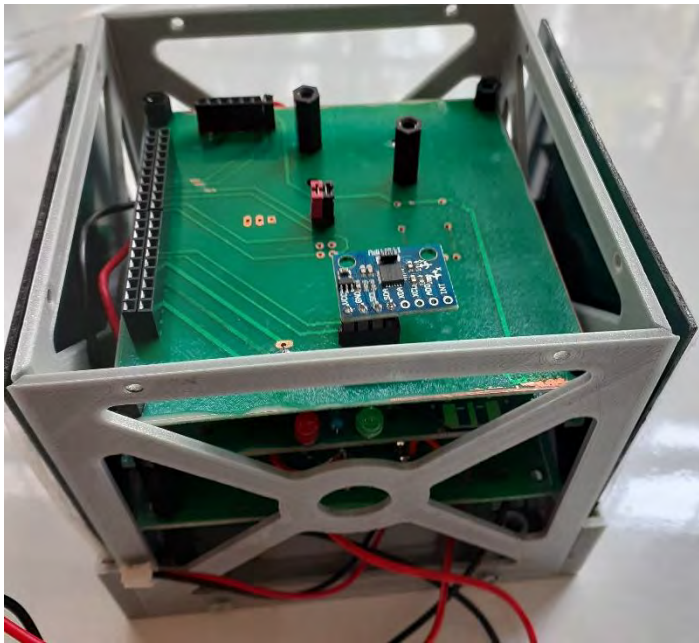
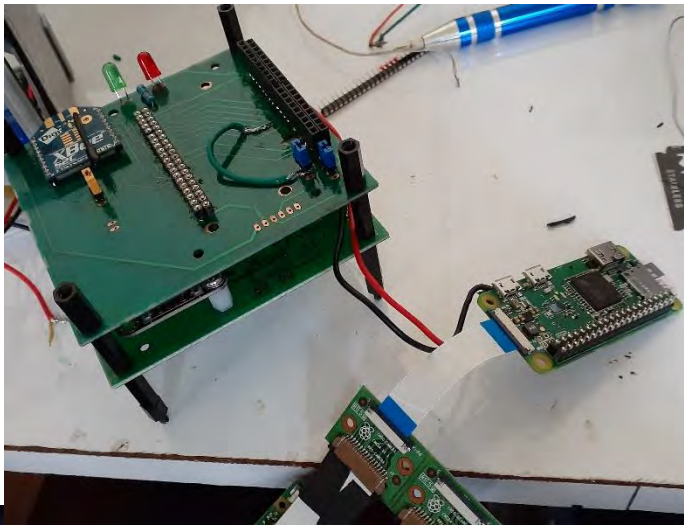
Etched Adapter Boards

NaSPUoN Development (3/4)

Assembly



Populated Adapter Boards



NaSPUoN Development (4/4)

Version 1



Version 2



Testing

Comm Test on UoN Towers



XBee Ground Terminal



Comm Test from top of UoN Towers

Demo to KSA

- Held on 14th Oct 2021 at Konza City
- Practical demo on a drone
- Points awarded by a panel of judges



UoN Team present to judges' panel



NaSPUoN ready for flight on a drone



Winners

- NaSPUoN announced as overall winner from 5 universities on 16th Nov, 2021



Kenya Space Agency @SpaceAgencyKE · Nov 16, 2021

4/4 The winner for the Research Grant 2020/21 went to the university of Nairobi @uonbi @vc

Worth a celebration



UoN Team receives the Overall Winner Award

Ongoing & Future Projects

Kenya Space Agency (KSA) 3U Engineering Model Development

- **NaSPUoN Team is a member of the 4 universities consortium**

- Sponsored by KSA Research Grant 2021/2022

<https://ksa.go.ke/news/ksa-research-grant-awards-for-space-tech>

**End of
report from
Kenya**

Zero-G Peace Mission 2030 (0G2030)

- Partnership between UoN, University of Arizona & Space Trust

HOME

UoN , University of Arizona and Space Trust partner in Space Peace Mission 2030 (0G2030)

Monday, January 10, 2022

University of Nairobi, University of Arizona and Space Trust have partnered to develop a series of Earth-orbiting space craft built by university students as a frontier for peace. The peace satellite project, 0G2030, which stands for zero gravity, aligns itself with the UN 2030 agenda for sustainable development.

<https://www.uonbi.ac.ke/news/uon-university-arizona-and-space-trust-partner-space-peace-mission-2030-0g2030>

05. 2022 CubeSat Prize by Arizona State University



I think some of the BIRDS projects have a good chance to win this contest---so read on.

If you want to compete, then to do so. You do not need Kyutech's approval. Just do it, and bring glory to your country.

https://news.asu.edu/20220126-asus-interplanetary-initiative-now-accepting-nominations-cubesat-delivery-prize?j=4569146&sfmc_sub=119941903&l=7013_HTML&u=34083285&mid=518002275&jb=0

ASU's Interplanetary Initiative now accepting nominations for CubeSat Delivery Prize

Award boosts underrepresented CubeSat teams

https://news.asu.edu/20220126-asus-interplanetary-initiative-now-accepting-nominations-cubesat-delivery-prize?i=4569146&sfmc_sub=119941903&l=7013_HTML&u=34083285&mid=518002275&jb=0

Arizona State University's [Interplanetary Initiative](#) is now accepting nominations for its 2022 CubeSat Delivery Prize. The prize will recognize an outstanding achievement by a novice team launching a CubeSat in order to encourage new groups or underrepresented people or schools to engage in space education and promote CubeSat education.

Eligible teams may come from a school or country that does not have a track record of successful missions, have overcome adversity, have launched a mission that creates a compelling educational opportunity or have engaged a unique coalition of collaborators.



[Download Full Image](#)

Teams may self-nominate or nominate another team.

Learn more and share your story [here](#).

Nominees will be reviewed and scored by an expert evaluation panel. The winner will be announced in May 2022.

The winning team will receive a cash prize of \$7,500 and its story will be shared with the world through ASU's communications channels, the Interplanetary Initiative's social media channels and newsletter, reaching thousands of people, and a guest spot on the "Mission:

Interplanetary" podcast.

"Delivering a working spacecraft for launch is a huge victory for any non-professional team. This award shows our appreciation for the kind of effort this represents," said Danny Jacobs, associate director of the Interplanetary Initiative.

https://news.asu.edu/20220126-asus-interplanetary-initiative-now-accepting-nominations-cubesat-delivery-prize?j=4569146&sfmc_sub=119941903&l=7013_HTML&u=34083285&mid=518002275&jb=0

The award was made possible thanks to the generosity of the Shojaee Foundation.

The Interplanetary Initiative at Arizona State University engages broadly across disciplines and sectors to create an interplanetary future built upon cooperative and inclusive new structures, systems and perspectives. We study and solve the big social and systems questions that pave our future in space. The Interplanetary Initiative most recently announced a collaboration with Blue Origin and other space leaders to build Orbital Reef, a premier, mixed-use space station in low Earth orbit designed to open multiple new markets in space.

Creativity

Tempe campus

Interplanetary Initiative

School of Earth and Space Exploration

Space exploration

Education

Alumni

Online student

Campus student

Announcements



Sally Young
Senior Communications Specialist, Interplanetary Initiative
Syoung35@asu.edu

https://news.asu.edu/20220126-asus-interplanetary-initiative-now-accepting-nominations-cubesat-delivery-prize?j=4569146&sfmc_sub=119941903&l=7013_HTML&u=34083285&mid=518002275&jb=0

The Prize

- A review panel of experts will be assembled by the Interplanetary Initiative to review nominated teams and will award **\$7,500** to the winning university or college.
- A well-told story is often our best chance to capture the attention of the world. We will **share the winning team's story of success in space** against the odds. We will also invite the winning team to do a guest spot on the *Mission: Interplanetary* podcast and publicize its story through ASU media channels reaching thousands of people.

Timeline

Editor's note: I think one of our BIRDS teams can win this.

- **February 2, 2022**
The CubeSat Delivery Prize will be announced and promoted through March 15, 2022
- **March 15, 2022** ← **Note to Kyutech students**
Nominations due! Each valid nomination receives a score from the judges on our expert evaluation panel where the top finalist team will be selected and named the winner of the 2022 CubeSat Delivery Prize.
- **March - May, 2022**
Interplanetary Initiative team will publicize the winning team's story across multiple online channels and media outlets.

06. Report from Cameroon



The following report comes from Lily (of Cameroon), who has contributed several times to this newsletter in the past. She recently attended 3 space events in Africa.

- Editor

My Experience Attending 3 space events in Africa



- Life After I AC 2021

I have heard a lot of people say attending IAC is a life changing experience, but I did not know it was going to happen so soon for me. After attending the 28th UN/IAF workshop followed by the 72nd IAC in Dubai, in October 2021, a lot has changed for me and I am happy to share with you all. At IAC, not only did I get the chance to meet so many actors and young professionals within the space sector; some of whom I had been longing to meet in person like Dr. Danielle Wood and Prof. G Maeda, but also met with some leaders of the African Space Program who honored me with invitations to attend some high-level Geospatial and space events which were coming up in Africa at that time.

Lily R. ASONGFAC
18 Jan 2022



AFRICAGIS 2021 – 22nd to 26th November 2021 in Abidjan, Ivory Coast

Themed “Geospatial innovation and Science for Africa’s growth and sustainable development.” The AfricaGIS Conference and Exhibition contributed to the development of skills and institutional capacity in geo-information across the continent. This event served as a platform bringing key stakeholders including professionals, government officials, development agencies, policy and decision-makers to deliberate on innovations in the field of geospatial information technology and its potential contribution to development.



“Welcome to Ivory Coast” -
at the airport



Myself and Monique from Cameroon
posing by the event backdrop,
approximately pointing at our country
on the map



Myself and some amazing ladies at the event. From
left to right; Angelique from Rwanda, Beza from
Ethiopia, Monique from Cameroon, Ruvimbo from
Zimbabwe



Photo of me by a very nice tall
sculpture outside the event
venue



There were several panel sessions with industry leaders which were really informative and eye opening



Gala Dinner, with several cultural performances, music, food and drinks



Photo taken after a meeting with some officials from the African Union Commission.



One of my favorite things was breakfast at the hotel.



During this event, it was announced by the leaders in the Ivorian government that Ivory Coast plans to create a space agency. This was great news, more African countries are seeing the power of space

1st IAA AFRICAN SYMPOSIUM ON SMALL SATELLITES – 29 Nov to 1st Dec 2021 in Stellenbosch South Africa



Selfie of myself and Dr Minoo Rathnasabapathy from MIT. She delivered a keynote on the work they do at Space Enabled Research group



There were several technical sessions around topics like (Innovative Satellite Missions & Technology, the Next Generation in Space, Small Satellite Projects for STEM Education and Human Capacity-Building with a focus on Africa, Technology Partnerships and Opportunities for International Collaboration, Satellite Development in an Era of Constellations. etc.

1st IAA African Space Party, Sponsored by CUBE SPACE



Tried out Tacos for my very first time. Liked it

GMES and Africa 2nd FORUM – 2nd to 6th Dec 2021 in Abidjan, Ivory Coast

The objective of the forum is not only to strengthen dialogue and networking between stakeholders but also to discuss the scientific and strategic matters of the use of the Earth Observatory for Africa's sustainable development. It is an engagement forum for various participants to enhance and incorporate earth observation services for socio-economic development.



Dr Tidiane Ouatarra
GMES and Africa Program Coordinator,
Africa Union Commission



Local Ivorian food called “Poulet Braise Attieke” which is grilled chicken and Acheke (some whitish starchy side dish made from fermented cassava)

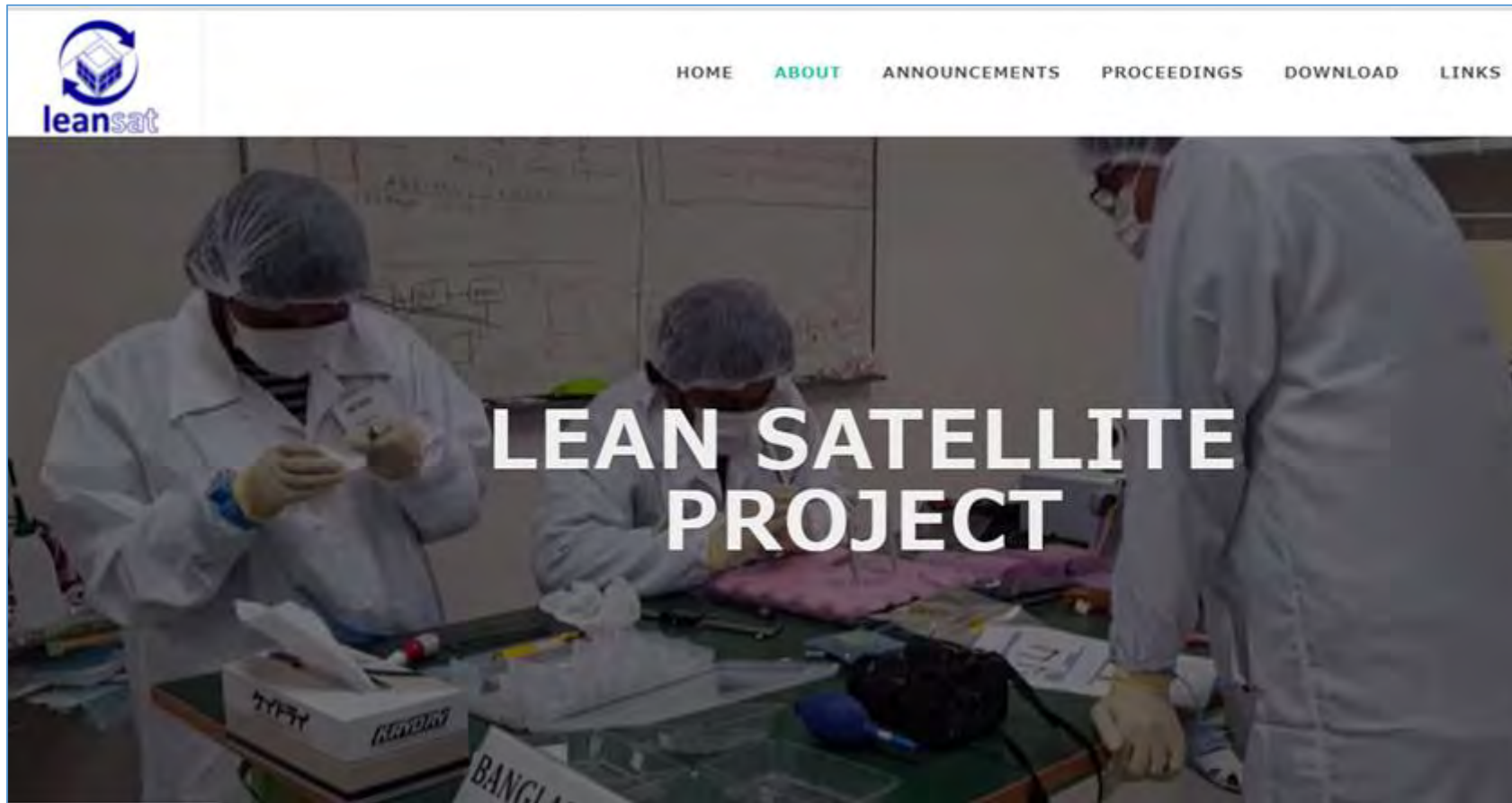
During this event, some of the ladies including myself met for 2 days to come up with a work plan on how to make space more accessible to women on the continent irrespective of their background, under an initiative which would be called the African Women in Space, born out of GMES & Africa Forum.

Through this, we aim to increase the involvement and participation of more women in space. It was overall a great experience for me, especially knowing that my journey and success inspires so many young girls, and more women can be opened to a world of possibilities. The “She did it, so can I” mentality is one I push for with my life as a case study. Thank you for reading my article and the **BIRDS Project Newsletter**. Hope you read from me again soon



End of this report

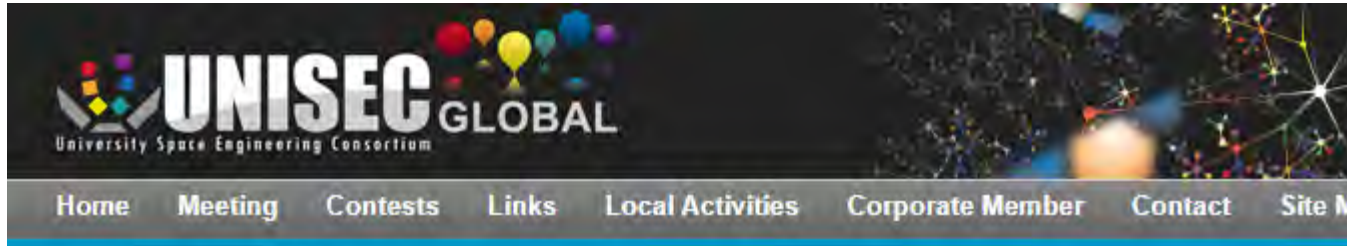
07. Any one can join Lean Sat Project



**Anyone
can join
Lean
Satellite
Project**

<https://lean-sat.org/>

08. Monthly virtual meeting of UNISEC-Global



[Home](#) > [Meetings](#) > [Virtual Meeting](#)

Virtual Meeting

17th Virtual UNISEC-Global Meeting

17th UNISEC-Global Meeting will be held on Jan 22, 2022.

 [Program is here](#)

[Registration is here](#)

Moderator: George Maeda, Kyushu Institute of Technology

| Presentation |
|--|
| Opening Remarks Shinichi Nakasuka, University of Tokyo |
| EgSA achievements in Capacity Building in 2021 Mohammed Khalil Ibrahim, Egyptian Space Agency |
| The STAMINA4Space Program - Transitioning from State University to Space Agency Maricor Soriano, National Institute of Physics, University of the Philippines Diliman |

You can access the data of all past meetings with this web link:

<http://www.unisec-global.org/virtual-meeting.html>

You are encouraged to attend this meeting each month – and *network* with a global academic community. You'll have fun.

On the following pages are the meeting flyers created by SEIC student Mark of the Philippines.

6th Virtual UNISEC-Global Meeting



Shinichi Nakasuka
The University of Tokyo



Hiroshi Koyama
Mitsubishi Electric Corporation



Alim Rustem Aslam
Istanbul Technological University



Tatsuya Arai
Oceanspace Systems

Feb 20, 2021
10:00pm – 00:00am
(GMT+09:00)

<http://www.unisec-global.org/virtual-meeting.html>

Program

Welcome &
Opening

Shinichi Nakasuka
The University of Tokyo

Presentation
1

From a UNISEC CubeSat to human spaceflight
Tatsuya Arai
Oceanspace Systems

Breakout
Discussion

Topic: Hands-on training during the pandemic
Moderator: Nate Taylor
UNISEC-Global

Regional
Report

Topic: UNISEC Turkey
Alim Rustem Aslam
Istanbul Technological University

Corporate
Presentation

Hiroshi Koyama
Mitsubishi Electric Corporation

Announcement
& Closing

Rei Kawashima
UNISEC-Global



7th Virtual UNISEC-Global Meeting

March 20, 2021
10:00pm – 00:00am
(GMT+09:00)

**SHINICHI
NAKASUKA**
The University of
Tokyo

PRESENTATION

NATE TAYLOR
UNISEC-Global
(Moderator)
*Topic: Competition
& Collaboration*

REGIONAL REPORTS

JERRY SELLER
TSTI

Topic: TSTI

CLOSING

WELCOME & OPENING

Moderator:
GEORGE MAEDA
Kyushu Institute of Technology

KEN BIBA
AeroPAC

*Topic: ARLISS
History and Future*

BREAKOUT SESSION

**NIKHIL RIYAZ &
TARUN SAI REDDY**
UNISEC-India

**CHAWALWAT
MARTKAMJAN**
UNISEC-Thailand

CORPORATE PRESENTATION

**REI
KAWASHIMA**
UNISEC-Global

*Acknowledgment of
new members,
announcements*



Shinichi Nakasuka
The University of Tokyo



Ken Biba
AeroPAC



Jerry Seller
TSTI



Chawalwat Martkamjan
UNISEC-Thailand



Nikhil Riyaz
UNISEC-India



Tarun Sai Reddy
UNISEC-India

<http://www.unisec-global.org/virtual-meeting.html>

8th Virtual UNISEC-Global Meeting

Moderator: GEORGE MAEDA Kyutech, UNISEC-Japan

Theme: Access to space for all

April 17, 2021
10:00pm– 00:00am
(GMT +09:00)

SHINICHI NAKASUKA
The University of Tokyo

OPENING REMARKS

PRESENTATION

All the participants

Group Photo session

BREAKOUT SESSION

MENGU CHO
Kyushu Institute of Technology
UNISEC-Japan
Activity Report for UNISEC-Japan

NATE TAYLOR
UNISEC-Global
(Moderator)
Topic: How to realize access to space for all

REGIONAL REPORT

PROJECT REPORT

REI KAWASHIMA
UNISEC-Global

QUENTIN VERSPIEREN
The University of Tokyo
Topic: Investigating university-led space technology development and utilization capacity building programs

ANNOUNCEMENT, CLOSING

<http://www.unisec-global.org/virtual-meeting.html>





1

OPENING REMARKS

**SHINICHI
NAKASUKA**

The University of Tokyo

Moderator:
George Maeda, KyuTech, UNISEC-Japan



2

KEYNOTE SPEECH

**TAKAHIRO
OBARA**

Tohoku University

**Guidelines for Space
Weather Research and
Operation proposed by
Space Weather Expert
Group in UNCOPUOS**



3

PRESENTATION

**AYMAN
MAHMOUD
AHMED**

Egyptian Space Agency

**How to Monitor Space
Plasma with
Nanosatellites -
Challenges and
Opportunities**

THEME: SPACE WEATHER

4

BREAKOUT DISCUSSION

ALL PARTICIPANTS

MC:
Nate Taylor, UNISEC-Global

Theme:
Space Weather



5

PRESENTATION

**CARLOS
RODRIGUEZ**

Costa Rica Institute of
Technology

Costa Rica's Approach
- MIC6 and MIC7

6

CLOSING

**REI
KAWASHIMA**
UNISEC-Global

Acknowledgment,
announcements and
closing

Date: May 15, 2021

Time: 22:00 - 24:00 (JST, GMT+9)

<http://www.unisec-global.org/virtual-meeting.html>

9th Virtual UNISEC-Global Meeting

10TH VIRTUAL UNISEC-GLOBAL MEETING

June 19, 2021 Time: 22:00 - 24:00 (JST)

Moderator: George Maeda, KyuTech, UNISEC-Global

**OPENING REMARKS**

Mengu Cho, Kyushu Institute of Technology

**KEYNOTE SPEECH**

Questin Verspieren, The University of Tokyo

Topic: Space Education Rating

**BREAKOUT SESSION**

All Participants

Moderator: Nate Taylor, UNISEC-Global

Theme: Space Education Rating

**ACTIVITY REPORT: UNISEC-EGYPT**

Ayman Kassem, Cairo University

<http://www.unisec-global.org/ibrahim.html>**ACTIVITY REPORT: UNISEC-MONGOLIA**

Tsolmon Renchin, The National University of Mongolia

<http://www.unisec-global.org/tsolmon.html>**CLOSING**

Rei Kawashima, UNISEC-Global

<http://www.unisec-global.org/virtual-meeting.html>

11th Virtual UNISEC-Global Meeting

July 17, 2021 Time: 22:00 - 24:00 (JST)

Moderator: George Maeda, KyuTech, UNISEC-Global

OPENING REMARKS

Prof. Martin Sweeting, SSTL and SSC

KEYNOTE SPEECH

Juan De Dalmau, International Space University

<https://www.isunet.edu/mr-juan-de-dalmau/>

Topic: Healthy Interdependency - ISU and Space Agencies

BREAKOUT SESSION

All Participants

Moderator: Nate Taylor, UNISEC-Global

Theme: Space Education: Scenario Study

ACTIVITY REPORT: UNISEC-NEPAL

Abhas Maskey, UNISEC-Nepal

ANNOUNCEMENT & CLOSING

Rei Kawashima, UNISEC-Global

and those who have announcements

<http://www.unisec-global.org/virtual-meeting.html>



12th Virtual UNISEC-Global Meeting

August 21, 2021 Time: 22:00 - 24:00 (JST)

Moderator: George Maeda, KyuTech, UNISEC-Global

OPENING REMARKS

Herman Steyn
Stellenbosch University

PRESENTATION

Yeshurun Alemayehu Adde(Kibret)
Ethiopian Space Science & Technology Institute
Topic: Overview of Space Science & Technology Development in Ethiopia

BREAKOUT SESSION

All Participants
Moderator: Nate Taylor, UNISEC-Global
Theme: Space Education Policy Case Study

ACTIVITY REPORT: UNISEC-PERU

Margarita Mondragon (TBC)

ANNOUNCEMENT & CLOSING

Rei Kawashima, UNISEC-Global
and those who have announcements



<http://www.unisec-global.org/virtual-meeting.html>



13TH VIRTUAL UNISEC-GLOBAL MEETING



Moderator: George Maeda, KyuTech, UNISEC-Global

OPENING REMARKS

Toshinori Kuwahara, Tohoku University

PRESENTATION

Michael Davis, The Andy Thomas Foundation

Topic: An Australian Space Story

BREAKOUT SESSION

All Participants

Moderator: Nate Taylor, UNISEC-Global

Theme: TBD

ACTIVITY REPORT

Kamel Besbes, UNISEC-Tunisia

ANNOUNCEMENT & CLOSING

Rei Kawashima, UNISEC-Global
and those who have announcements



Theme:
Your Faith, Your Story

SEPTEMBER 18, 2021
TIME: 22:00 - 24:00 (JST)

<http://www.unisec-global.org/virtual-meeting.html>

14th Virtual UNISEC-GLOBAL MEETING



Welcome Speech
PROF. SHINICHI NAKASUKA
The University of Tokyo

OCTOBER 16, 2021
10:00 PM to
00:00 AM (JST)

THEME:
LOST DARK SKY
and its
CHALLENGES

Keynote Speech
PROF. DIDIER QUELOZ

Jacksonian Professorship of Natural Philosophy, U. Cambridge (UK)
Professor of Physics ETH-Z, Switzerland
Fellow of Trinity College, Cambridge

2019 Nobel Laureate in Physics
Topic: Lost Dark Sky



<http://www.unisec-global.org/virtual-meeting.html>



15TH VIRTUAL UNISEC-GLOBAL MEETING



Theme:
**Deep Space
Exploration**
with nano/microsatellites

Moderator:
George Maeda,
KyuTech, UNISEC-Global

November 20, 2021

Time: 22:00 - 24:00 (JST)

OPENING REMARKS & MIC7 RESULTS

Herman Steyn
Stellenbosch University

PRESENTATION

Ryu Funase, The University of Tokyo
Deep Space Exploration with nano/microsatellites

PRESENTATION

7th Mission Idea Contest Winner

BREAKOUT SESSION

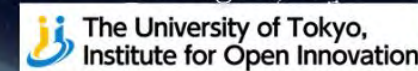
All Participants
Moderator: Nate Taylor, UNISEC-Global
Theme:

ANNOUNCEMENT & CLOSING

Rei Kawashima, UNISEC-Global
and those who have announcements



Co-Organizers



Collaborator



<http://www.unisec-global.org/virtual-meeting.html>

16TH VIRTUAL UNISEC-GLOBAL MEETING

OPENING REMARKS

Alim Rustem Aslan, Istanbul Technical University
UNISEC-TR Activities & UNISEC-Global Meeting

KEYNOTE SPEECH

Wataru Torii, ISAS/JAXA

Topic: Please help receive the UHF-band signal from
the world's smallest Moon lander, OMOTENASHI

PRESENTATION

A Year in Review - UNISEC-Global
Nate Taylor, UNISEC-Global

BREAKOUT SESSION

All Participants
Moderator: Nate Taylor, UNISEC-Global

MIC6 PROGRESS REPORT

Carlos Rodriguez, Costa Rica Institute of Technology
Topic: MUSA Project Suborbital Flight

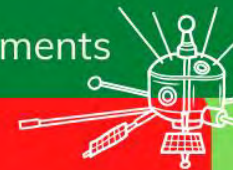
ANNOUNCEMENT & CLOSING

Rei Kawashima, UNISEC-Global and those who have announcements

DECEMBER 18, 2021

10:00 PM to 00:00 AM (JST)

<http://www.unisec-global.org/virtual-meeting.html>



17th Virtual UNISEC-Global Meeting



OPENING REMARKS

Shinichi Nakasuka
University of Tokyo

JANUARY 22, 2022

10:00 PM to 00:00 AM (JST)

PRESENTATIONS

Mohammed Khalil Ibrahim, Egyptian Space Agency
Topic: EgSA achievements in Capacity Building in 2021

Maricor Soriano
National Institute of Physics, University of the Philippines-Diliman
Topic: The STAMINA4Space Program -
Transitioning from State University to Space Agency

GROUP PHOTO SESSION

All Participants

UNISEC LOCAL CHAPTER EMPOWERMENT

Nate Taylor, UNISEC-Global

BREAKOUT SESSION

All Participants (MC: Nate Taylor, UNISEC-Global)

ANNOUNCEMENT & CLOSING

Rei Kawashima, UNISEC-Global
and those who have announcements

THEME:

*Local Chapter
Empowerment*



Moderator: George Maeda, KyuTech, UNISEC-Global

<http://www.unisec-global.org/virtual-meeting.html>

09. Laboratory group photo of January 2022




Lab Photo of 7 January 2022 – staff is seated in front, with the students behind them



10. Ground station update from Zimbabwe

The following report (next few pages) is an update of the report shown below



10. ZIMSAT-1 Ground Station Progress



Zimbabwe National Geospatial And Space Agency



By : Tatenda G. S. Marimo
Acting Outreach Officer
13 December 2021



BIRDS Project Newsletter – No. 71

Page 55 of 101

Pages 55-64
Issue No. 71
of the
*BIRDS Project
Newsletter*

(the BPN issue
of last month)



ZIMBABWE NATIONAL GEOSPATIAL AND SPACE AGENCY



ZIMSAT-1 GROUND STATION PROGRESS

By : Tatenda G. S. Marimo
Acting Outreach Officer
20 January 2022



PROCUREMENT OF GROUND STATION EQUIPMENT FOR ZIMSAT-1

- ❑ The procurement status improved from the 92% in December to 95% in January 2022.
- ❑ All the imported equipment has been cleared by customs and delivered to ZINGSA.
- ❑ Pre tests and checks of all Ground Station equipment is being conducted by engineers.
- ❑ Administrative phase of the Control room set up is at an advanced stage.



Figure 1: Part of the procured equipment delivered to ZINGSA

Pre-Installation Checks



Figure 2: ZINGSA Engineers carrying out pre-test checks

- ZINGSA engineers familiarized with the procured equipment .
- Each procured item was checked against the Parts List in order to ascertain whether any item is missing or damaged.
- Preparation of remote control cables and termination of connectors was carried out ensuring that the cables were correctly wired.
- The control unit and the rotator assembly was setup for an operational check using the prescribed procedure.
- Preliminary operational checks were carried out on the rotator system in preparation of the actual installation.

END OF ARTICLE



Figure 3: Great Zimbabwe Ruins (A tourism destination)



THANK YOU

11. Highlighting Japan: Origami

**PUBLIC RELATIONS OFFICE**
GOVERNMENT OF JAPAN 

[Home](#) > Highlighting JAPAN

**HIGHLIGHTING
Japan**

“HIGHLIGHTING Japan” is an official monthly online magazine to promote understanding of Japan for the people around the world, with variety of themes.

もっと知りたい、伝えたい。日本の今をアップデート ～ オンライン・マガジン HIGHLIGHTING JAPAN

[Tweet](#) [Share](#)

#163 December 2021
THE DIVERSE WORLD OF ORIGAMI

Origami, the art or craft of folding paper, has been enjoyed in Japan for several centuries and is now a popular pastime in many countries around the world. Origami takes on many forms, both simple and complex, and even finds application in space technologies. In this month's issue, we introduce the diverse world of origami.



ACCESS POINT:

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



12. The Japanese members of the IAF

INTERNATIONAL ASTRONAUTICAL FEDERATION



The IAF is an outstanding network of 433 members from 72 countries, including all leading space agencies, companies, societies, associations, museums and institutes worldwide. Being a part of it means belonging to a worldwide community that cooperates daily to promote space activities, to develop new technologies, and to promote awareness about space to government and societies, to better involve them and illustrate the benefits that might come from the utilization of space. Thanks to all its members, the IAF has been able to pursue these goals and its missions since its creation in 1951.

There are different ways in which IAF Members can get involved in the Federation activities. Scroll around these pages to find out the important role of IAF Members in creating IAF's main events and conferences, in shaping the discussion about space, for example by joining one of IAF many Technical or Administrative committees. IAF membership is a lifelong journey, and we look forward to supporting you throughout it.

FROM:

<https://www.iafastro.org/membership/>

IAF Members Countries



IAF Members Organizations



FROM:

<https://www.iafastro.org/membership/>

Members of the IAF (entities of Japan only – 15 in total)

https://www.iafastro.org/membership/all-members/?member_category=&contact_country=Japan&search=

01/15

ASTRAX, INC.

Space Industry • Member since 2021

2-23-17 Komachi
248-0006 Kamakura
JAPAN

02/15

ASTROSCALE

Space Industry • Member since 2014

1-16-4 Kinshi Sumida-ku
130-0013 Tokyo
JAPAN

03/15

IHI AEROSPACE CO, LTD.

Space Industry • Member since 1998

TOYOSU IHI BUILDING., 1-1, Toyosu 3-chome, Koto-ku
135- 0061 Tokyo
JAPAN

04/15

INFOSTELLAR

Space Industry • Member since 2018

32F Shinjuku Nomura Building, 1-26-2 Nishi-Shinjuku, Shinjuku-ku
163-0532 Tokyo
JAPAN

05/15

INSTITUTE FOR Q-SHU PIONEER OF SPACE, INC.

Space Industry • Member since 2019

5F 1-15-35 Tenjin, Chuo-ku
810-0001 Fukuoka
JAPAN

06/15

ISPACE, INC

Space Industry • Member since 2017

3-1-6 Azabudai, minato-ku
106-0041 Tokyo
JAPAN

07/15

JAPAN AEROSPACE EXPLORATION AGENCY (JAXA)

Space Agency and Office • Member since 2003

Ochanomizu Sola City, - 4-6 Kanda Surugadai, Chiyoda-ku
101-8008 Tokyo
JAPAN

08/15

JAPAN MANNED SPACE SYSTEMS CORPORATION (JAMSS)

Space Industry • Member since 2013

Otemachi Bldg., Otemachi, Chiyoda-Ku
100-0004 Tokyo
JAPAN

09/15

JAPAN SOCIETY FOR AERONAUTICS AND SPACE SCIENCES (JSASS)

Association and Professional Society • Member since 1990

Kinsa BLDG 4F, 4-1-21 Nihonbashi-muromachi, Chuo-Ku
103-0022 Tokyo
JAPAN

10/15

JAPANESE ROCKET SOCIETY

Association and Professional Society • Member since 1958

Business center for Academic Societies - Gakkai Center Building, C21 - 5-16-9 Hon-Komagome, Bunkyo-ku
113 Tokyo
JAPAN

11/15

KYUSHU INSTITUTE OF TECHNOLOGY

University • Member since 2011

1-1 Sensui Tobata-ku
804-8550 Kitakyushu
JAPAN

12/15

MITSUBISHI ELECTRIC CORPORATION

Space Industry • Member since 1998

2-7-3 Marunouchi Chiyoda-ku
100-8310 Tokyo
JAPAN

13/15

MITSUBISHI HEAVY INDUSTRIES, LTD.

Space Industry • Member since 1998

2-3 Marunouchi 3-Chome - Chiyoda-ku
100-8332 Tokyo
JAPAN

14/15

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY (NICT)

Research and Development • Member since 2016

4-2-1, Nukui-kitamachi, Koganei-shi
184-8795 Tokyo
JAPAN

15/15

NEC CORPORATION

Space Industry • Member since 2012

10 Nisshin-cho 1-chome, Fuchu
183 8551 Tokyo
JAPAN

**The only university
IAF member in Japan**

13. Highlights of IAF in 2021

DOWN LOAD THE PDF:

<https://www.iafastro.org/assets/files/publications/highlights/IAF-Highlights-2021-web.pdf>

**

The IAF Highlights 2021!

Following a very challenging year 2020 with many postponed events, 2021 provided a more optimistic outlook and more opportunities for travel and meetings in person. It was wonderful to finally be able to gather the whole space community and to meet and discuss in person at the different IAF events. The first in person conference since the start of the pandemic was GLEX 2021 in the Russian Federation, followed by IAC 2021 in the United Arab Emirates. Both conferences were successfully organized with a great international participation!

In this IAF Highlights 2021 you will be able to read more about the many interesting sessions and panels held at these events.

GLEX 2021 was hosted by ROSCOSMOS in the beautiful city of Saint Petersburg from 14 – 18 June 2021. More than 800 attendees from 34 countries gathered for the conference and another 1500 participants connected remotely. GLEX 2021 provided an important platform to exchange knowledge on the advancements in Space Exploration and was also the occasion to celebrate the 60th anniversary of Yuri Gagarin's spaceflight.

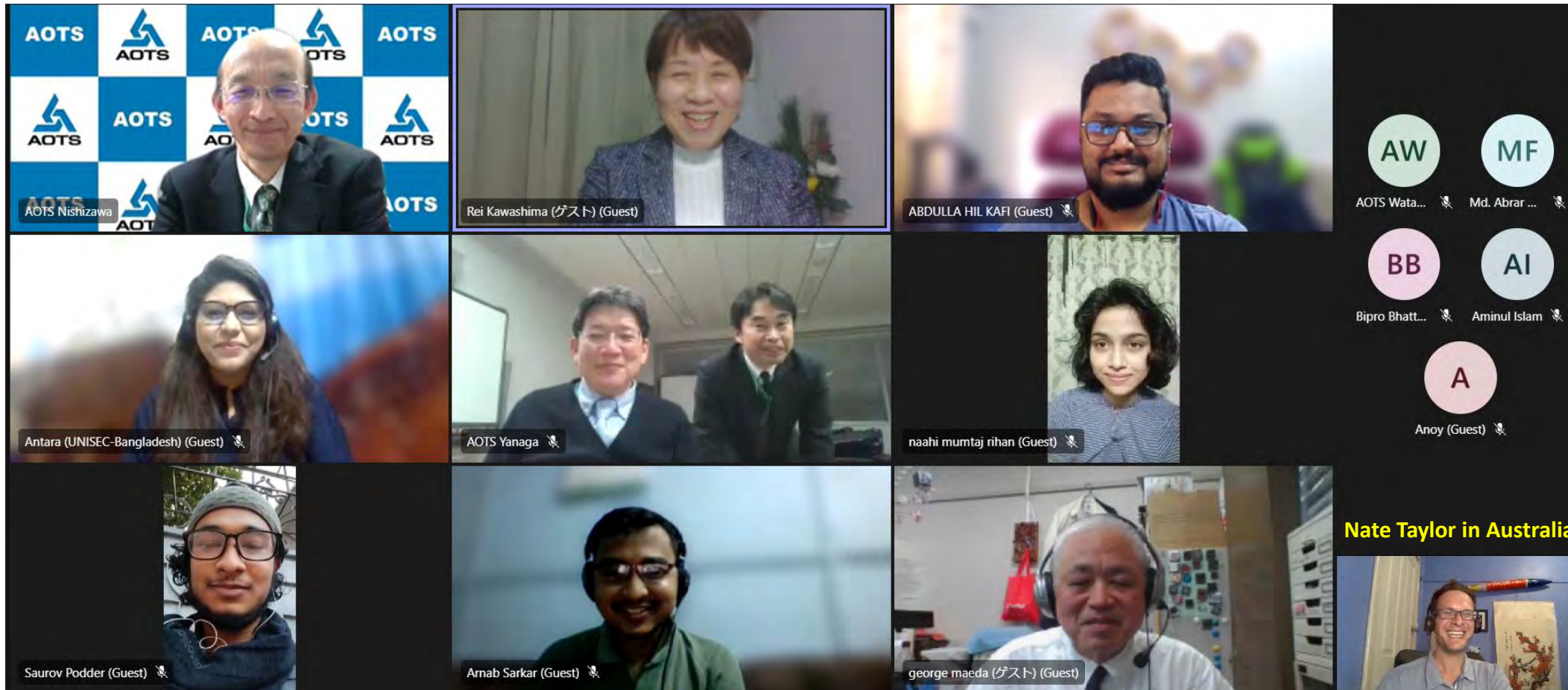
In October, the 72nd International Astronautical Congress gathered more than 5 000 delegates from 110 countries in Dubai! IAC 2021 was organized together with the Mohammed Bin Rashid Space Centre (MBRSC) under the theme 'Inspire, Innovate and Discover for the Benefit of Humankind'. As usual the IAC was packed with plenty of interesting events involving many space stakeholder communities. Even though we are getting more skilled to work in a virtual environment, we know it can never fully replace face to face meetings that offer global networking and multi-stakeholder attendance.

In these demanding times, we hope that the situation in 2022 will further improve worldwide and allow us to meet in person, for GLEC 2022 in Quito, Ecuador and the IAC 2022 in Paris, France!

Warmest Regards,
Pascale EHRENFREUND
IAF President



14. Virtual meeting between UNISEC-Japan and UNISEC-Bangladesh on 27 Jan 2022



During 19:45-21:45 on 27-JAN-2022, UNISEC held a consultation session with the local chapter of UNISEC in Bangladesh. This will be repeated with several more local chapters of other nations in February.

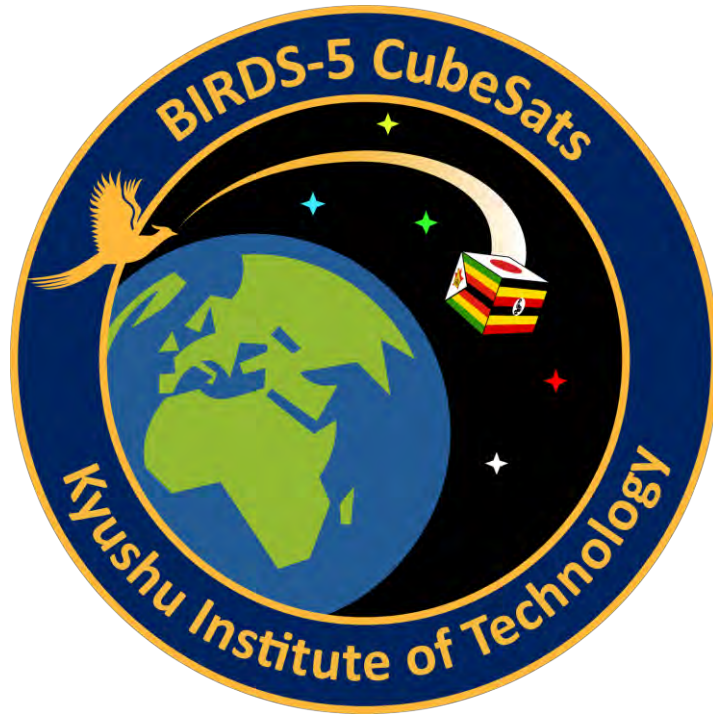
UNISEC side consisted of

- Rei Kawashima
 - Nate Taylor
 - George Maeda
- Sponsor of these sessions is AOTS of METI.

WHAT IS AOTS?

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

The Association for Overseas Technical Scholarship (AOTS; Japanese: 海外技術者研修協会) was established in 1959 with the support of the Ministry of International Trade and Industry (now the Ministry of Economy, Trade, and Industry, METI) as the first technical cooperation organization on a private basis in Japan. Its main purpose is to promote international economic cooperation and enhance mutual economic development and friendly relations between those countries and Japan.



The following sections are the BIRDS-5 articles for January 2022

(compiled by Timothy of Zimbabwe)



← **BIRDS-5**
units on 29 DEC
2021 (details in
the first report
by Victor – see
the next page)

BIRDS 5 FLIGHT MODEL SATELLITE



BIRDS 5 PROJECT MANAGER

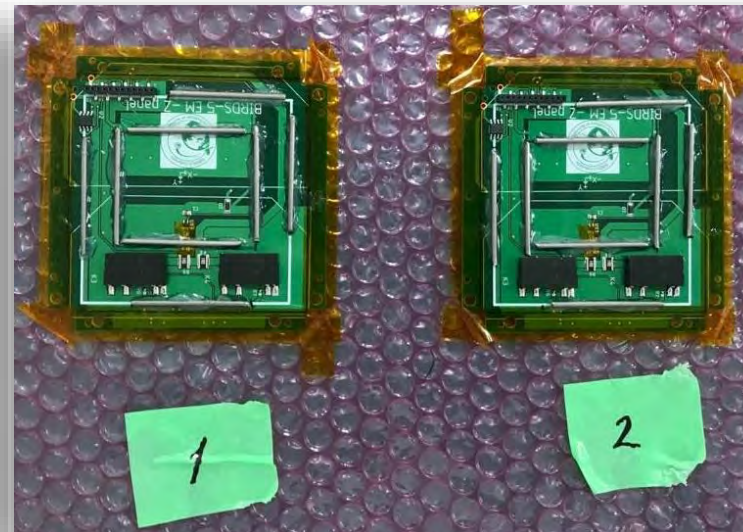
Victor Mukungunugwa

20/JAN/2022



ZIMBABWE

Preassembly Preparation



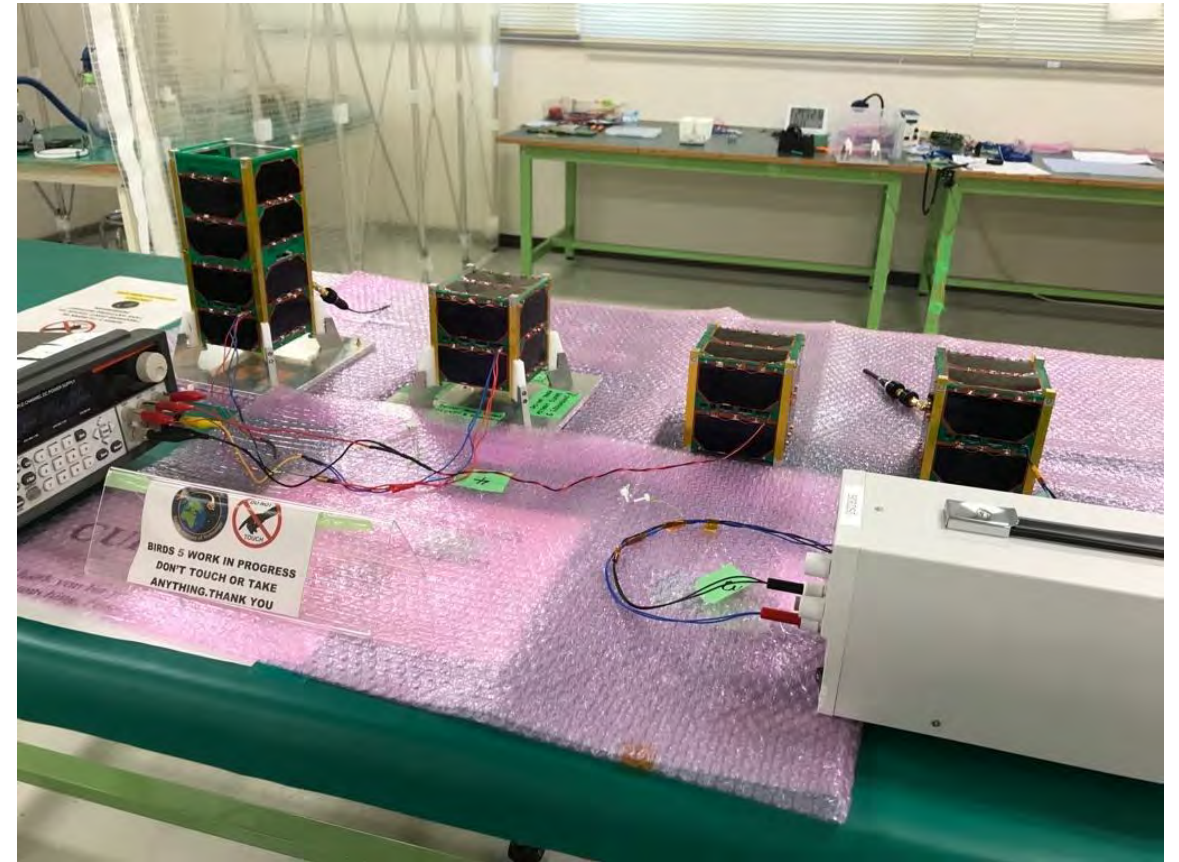
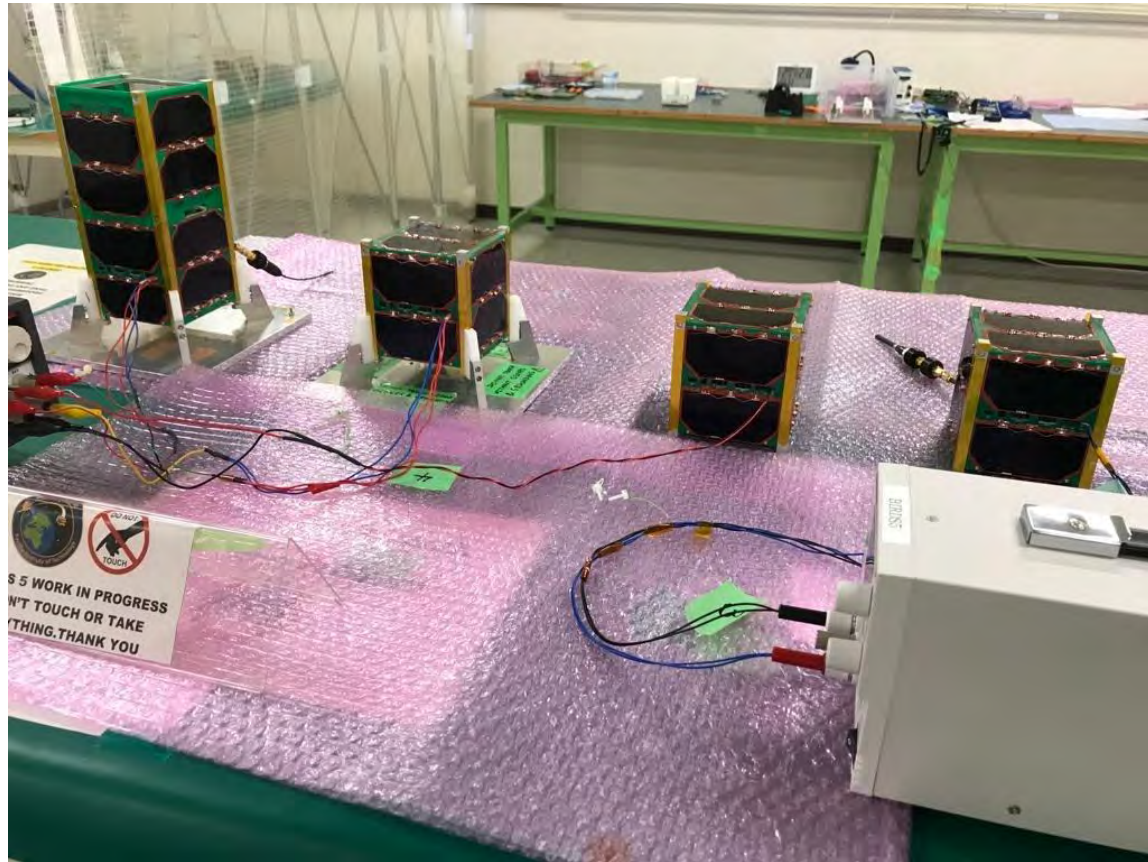
- Each satellite's components were labeled.
- Sixteen permanent magnets were mounted with Araldite glue on the rails.
- Eight hysteresis dampers were also mounted on the -Z panel.
- Solar panels were manually assembled

Fit Check for 1U satellite



- JAXA provides the interface between satellite and launch rocket using a POD.
- Each satellite need to fit in the pod and for that, JAXA provides a dummy pod with exact geometrical characteristics with the launch pod
- BIRDS 5 hire a dummy pod from JAXA to see if the flight model satellites can fit in the pod
- Pod insertion has a standard procedure to follow during
- In this photo Victor Mukungunugwa cleans the rails before inserting in to the pod

Charging of BIRDS 5 Assembled Satellites



Satellite Weighing



- JAXA pod has a pod that launches satellites using spring plungers, deployment springs and deployment switches therefore there are weight restrictions for various units of satellites.
- 1U satellite should be 1.33kg; BIRDS 5 couldn't check the weight for the 2U because it is still under integration.
- It is a relief that BIRDS 5 1U satellites are within the weight limits.

TAKA Satellite Multispectral Testing



Sun simulator

1U satellite

Rate table rotating



- BIRDS 5 uses 4 multispectral image filters namely:
 - 550nm
 - 680nm
 - 720nm
 - 790nm
- The Ugandan flag was used as a test object to see how the multispectral camera articulates the different colors
- A sun simulator was used as a light source since the multispectral camera is a passive sensor

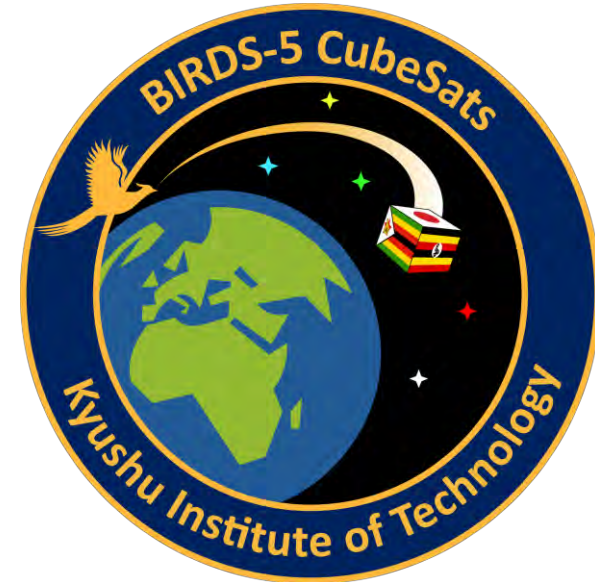
BIRDS-5 Antenna Deployment



By: Edgar MUJUNI

Uganda

13th January 2022



BIRDS-5 Antenna Deployment (Despatch Chamber Tests)

I am currently assigned to Antenna Deployment Task.

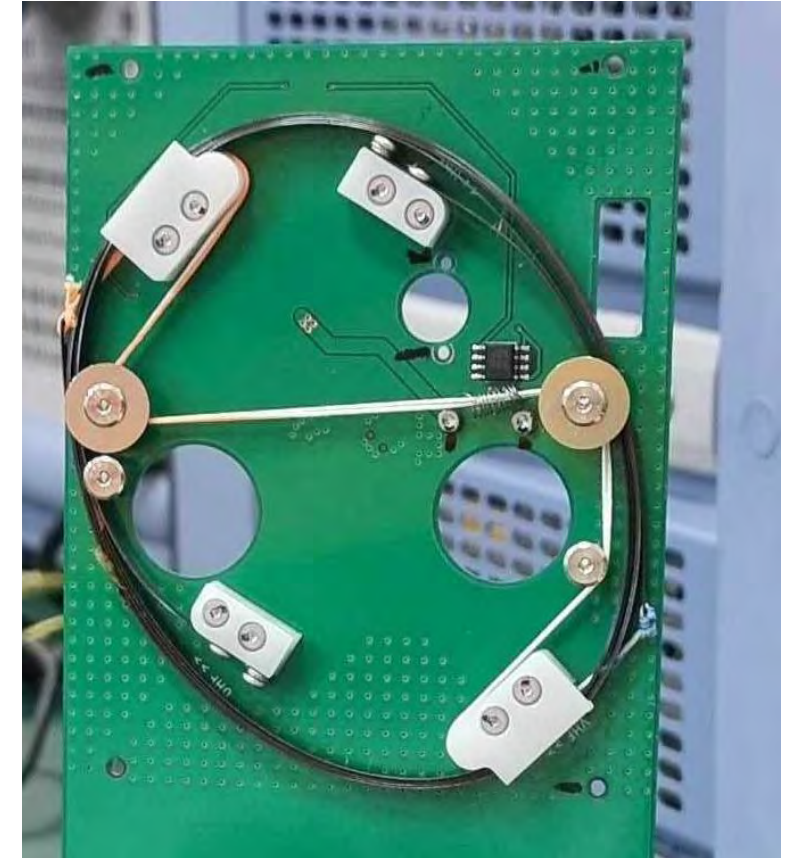
BIRDS-5 Satellite Antenna Configuration is Point Symmetric UHF Point Symmetric VHF (PUPV).

The antenna elements are coiled(tied) during the final assembly of the satellite to meet the launcher's Dimension requirements, and to avoid further damages to the delicate solar panels if kept loose.

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



Untied Antenna elements



Tied Antenna elements

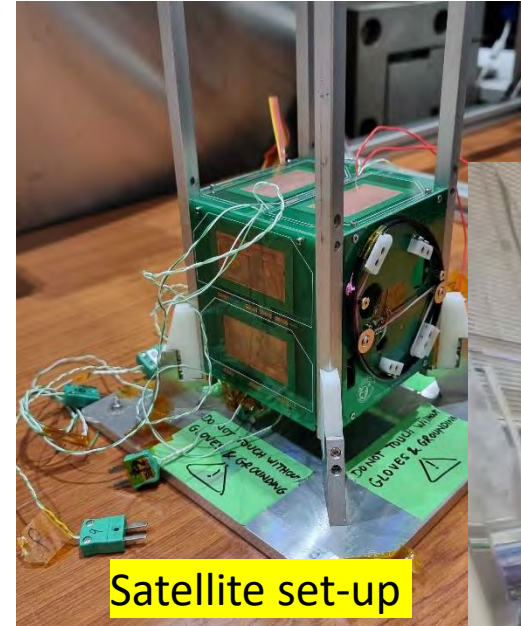
BIRDS-5 Antenna Deployment (Despatch Chamber Tests)

The temperatures in orbit vary widely from extreme cold in eclipse (approx. -30°C) to very hot in sunlight (approx. $+60^{\circ}\text{C}$).

The extreme cold temperatures are very critical to the antenna deployment since we employ burner circuit deployment system.

We want to ensure that even in these cold situations, the burner circuit will effectively deploy our antennas.

Kyutech has the facility to test this, it is called a **Despatch Chamber**.



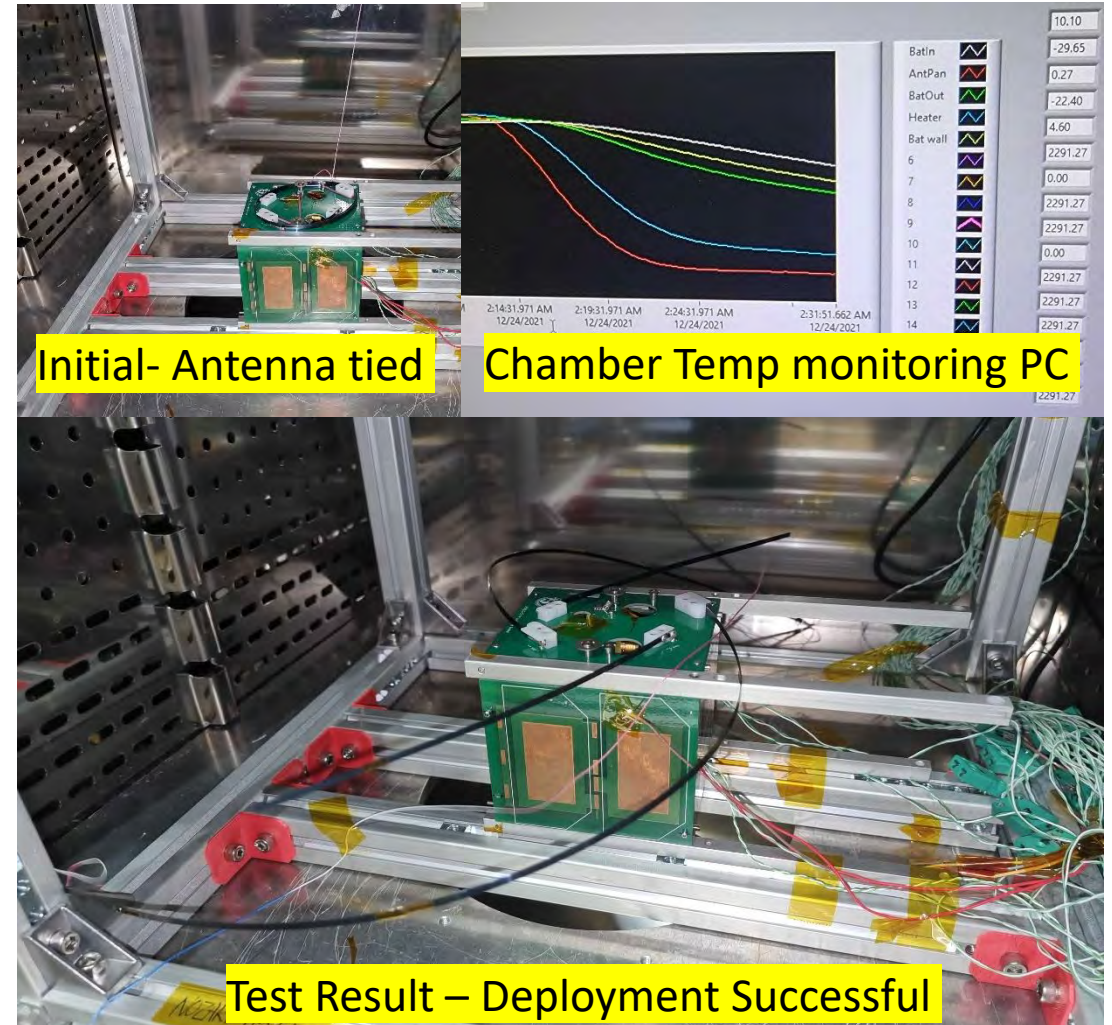
BIRDS-5 Antenna Deployment (Despatch Chamber Tests)

This Despatch Chamber is supplied with Liquid Nitrogen because it has a very low boiling point(-195°C), which easily takes the chamber temperatures very low in a short time.

The chamber is then maintained at this temperature(-30°C for our tests) for a few minutes(soaking) and then antenna deployment tests are conducted.

Successful deployment is a targeted result, otherwise the antenna deployment mechanism must be revised.

These tests were conducted for BIRDS-5 Antenna Subsystem on 24th December, 2021.



Drone Experiment to Calibrate Images



Bonny OMARA

From UGANDA

January 12, 2022



From BIRDS-5 Multispectral cameras

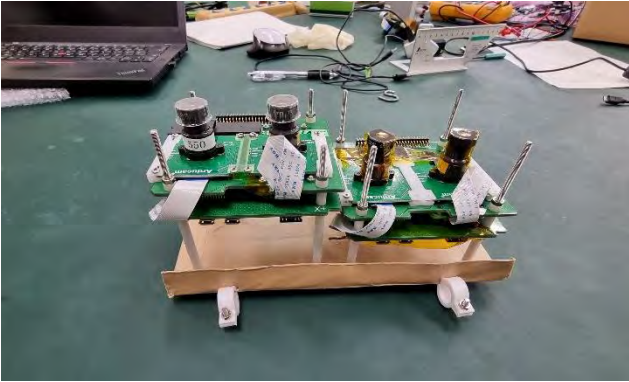
Background

The BIRDS-5 project is using a multispectral camera system to capture images of the member countries (Japan, Uganda, and Zimbabwe) from space to aid in the analysis of water quality, soil nitrogen/fertility, and land use and cover. However, before deployment, the outputs of these sensors must be calibrated on the ground.

The BIRDS-5 team lead by Bonny from Uganda conducted a drone experiment using their image sensors in conjunction with a standard RGB camera to correlate the sensor's output to what is on the ground.



Experiment Setup



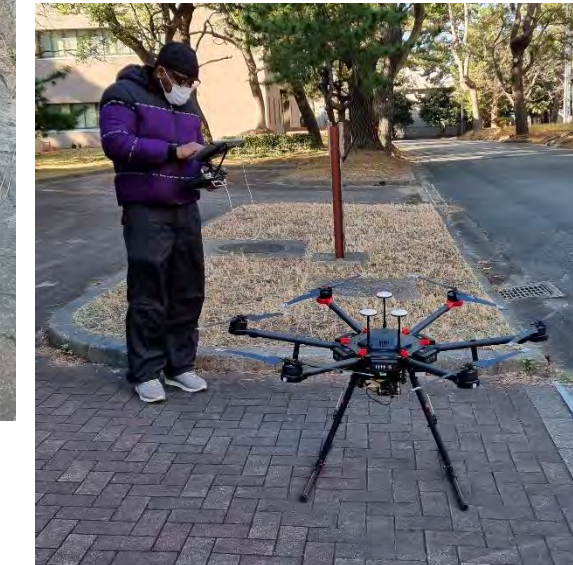
Payload Setup:
Four multi-spectral sensor and one standard RGB Camera.



The team was preparing to attach the payload to the drone. Teramoto sensei was on hand to confirm the drone's safety and compliance with applicable aviation laws.



Bonny was prepping the drone and cameras for takeoff.

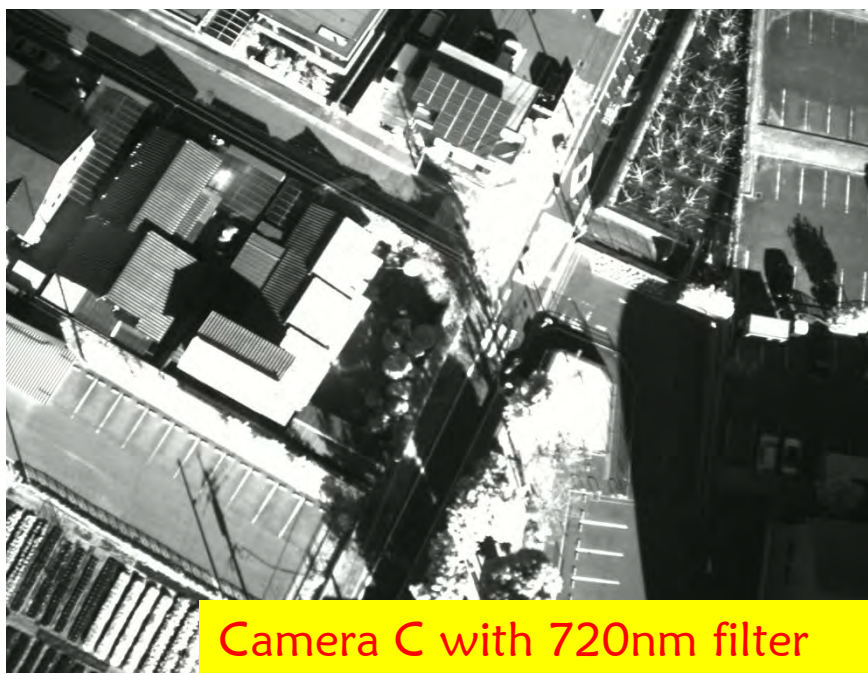


Victor, the day's pilot, was scheduled to depart from this location.



Drone Type:
DJI Matrice 600Pro

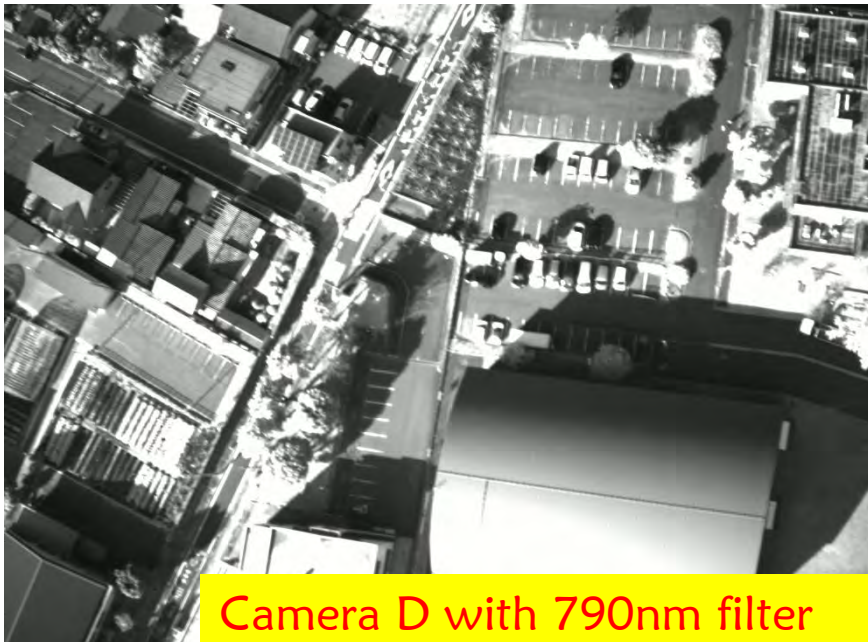
Flight Results:



Camera C with 720nm filter



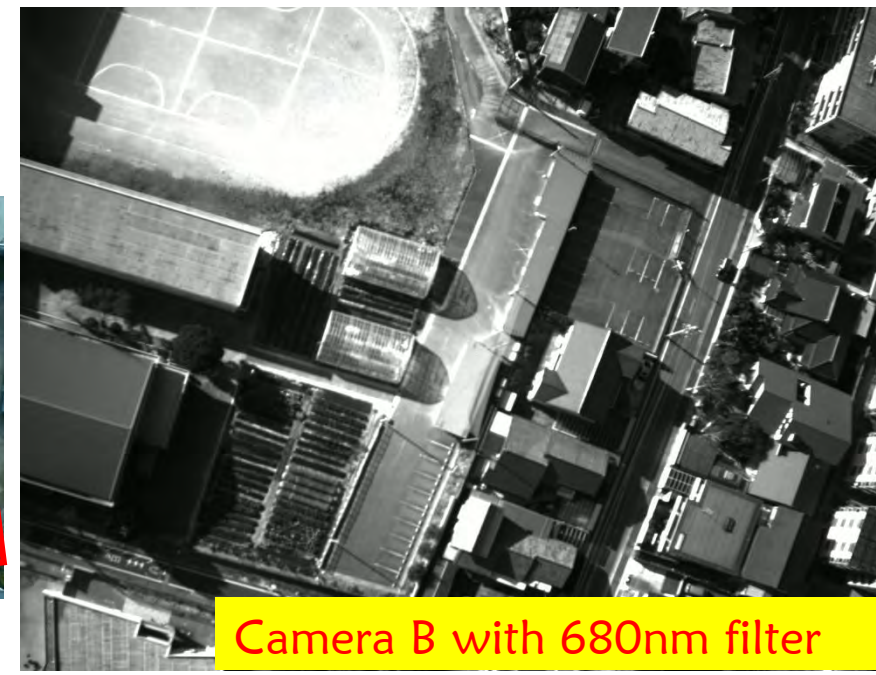
Camera B with 680nm filter



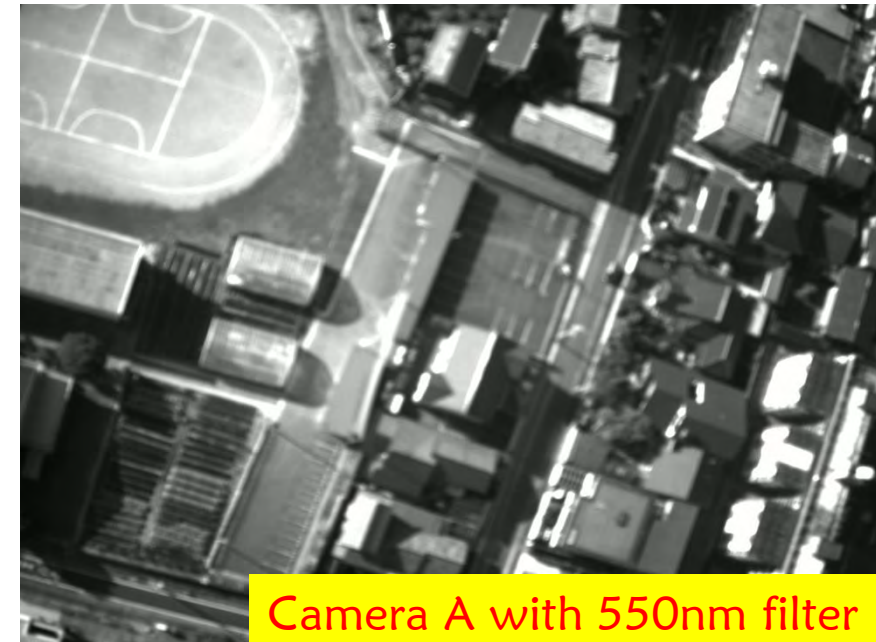
Camera D with 790nm filter

The BIRDS-5 cameras captured this part and the lower sides as extrapolated in the images.

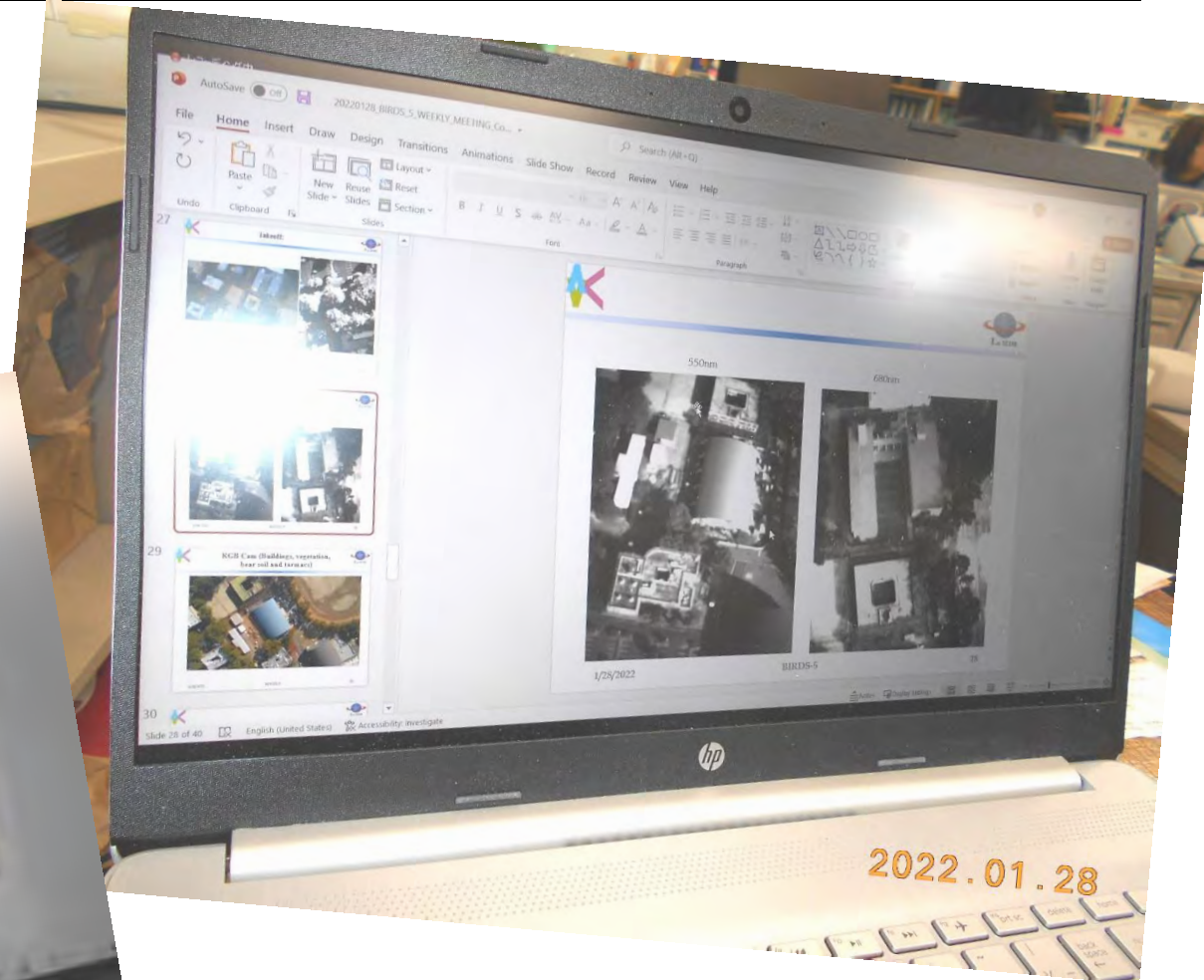
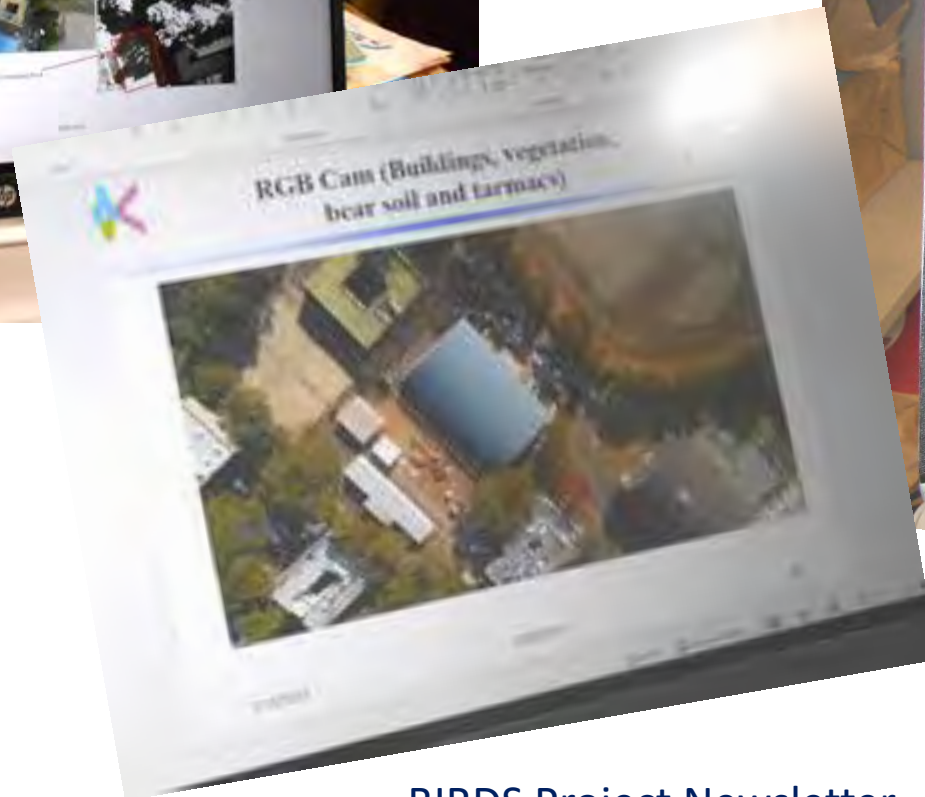
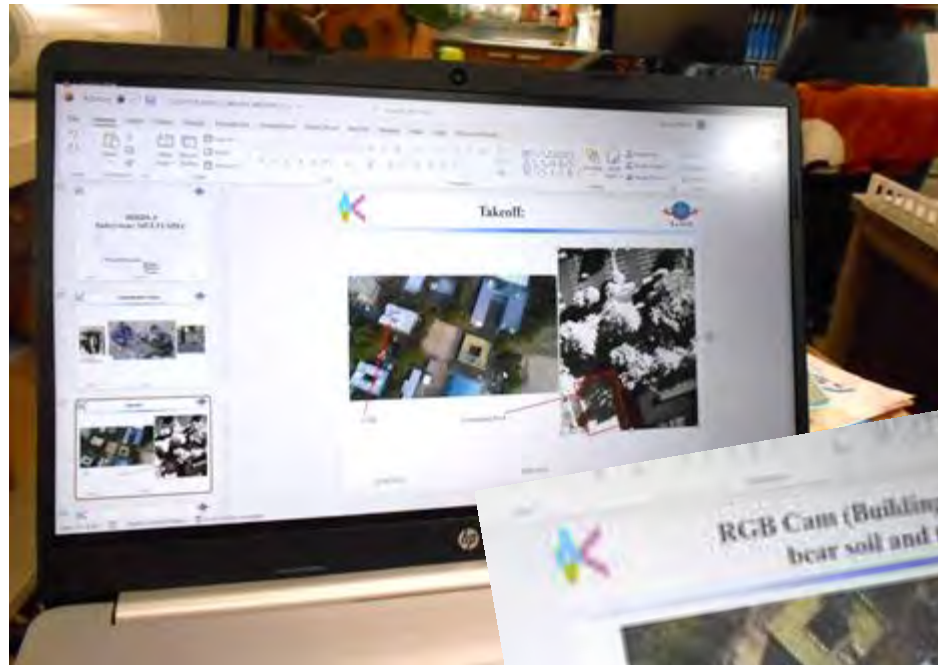
The optical spectrum of the BIRDS-5 Camera system will be calibrated using the reflectance characteristics of buildings, trees, tarred surfaces, grasses, and bare land observed in this shot.



Camera A with 550nm filter



Editor's Note: Bonny explained the drone experiment in detail during weekly BIRDS-5 ZOOM meeting of 28 Jan 2022 (these are screen shots of the editor's laptop)

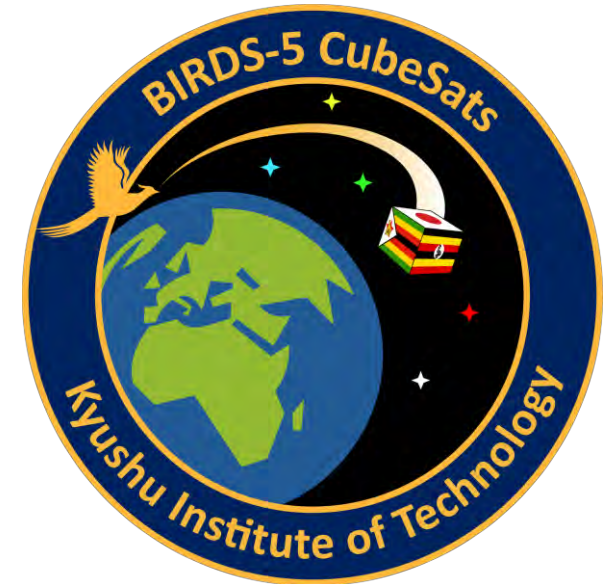


18. BIRDS-5: Anechoic chamber test updates

Anechoic Chamber Test Briefings



Ramson



By : Ramson Nyamukondiwa

Date: 15/01/2022

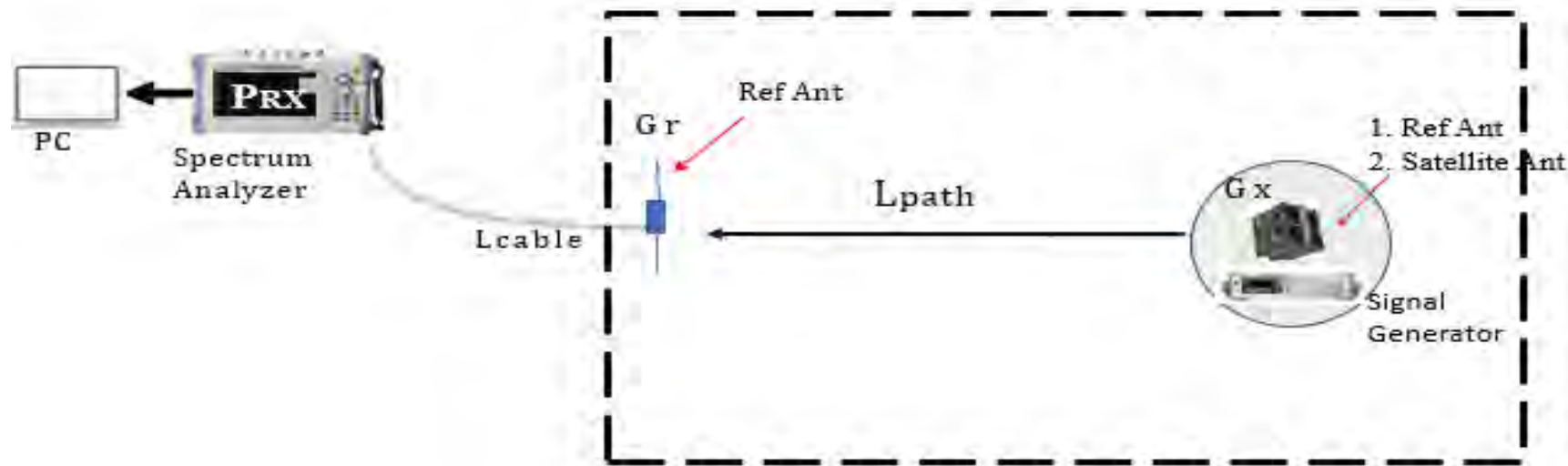
Email: munyaradzi.nyamukondiwa-ramson769@mail.kyutech.ac.jp

Outline

Steps for Antenna Tuning

1. Use Vector Network Analyser
2. Calibrate the cables with the VNA to ensure that the effects of cables, connectors, etc are nulled out before the measurements
3. Match the length of the antenna (cut or make long) to the desired S11 parameters (Frequency and election coefficient)
 - a) **S11 represents how much power is reflected from the antenna**, and hence is known as the reflection coefficient (sometimes written as gamma: or return loss
 - b) Use the dB Mag Curve and/or Smith Chart

Radiation Pattern Measurement procedure



1. Measure all the cable losses for each frequency
2. Calculate ideal Path Loss
3. Measure the path loss from Spectrum Analyzer reading using Ref. Antenna
4. Compare the path loss results & confirm them to be almost equal.
5. Conduct Radiation pattern measurement of Ref Antenna
6. Replace Reference Antenna with Satellite antenna (Satellite)
7. Conduct Radiation pattern measurement of Satellite Antenna.

Steps for measuring Transceiver Sensitivity

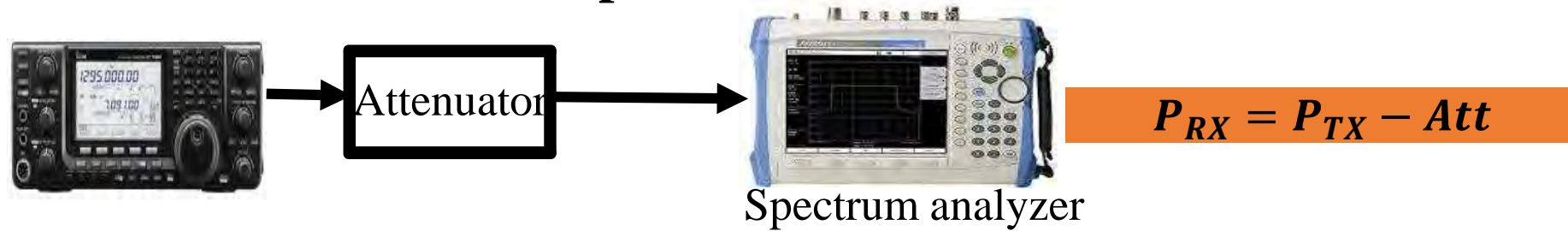
☐ Calibration

- Measure cable losses in Up and Downlink
- Measuring the ICOM radio transmission power
- Determine the practical antenna gains of
 - ✓ Ref Antenna and BIRDS antenna
- Determine the path loss for Up and Downlink
- Measure received power at the antenna

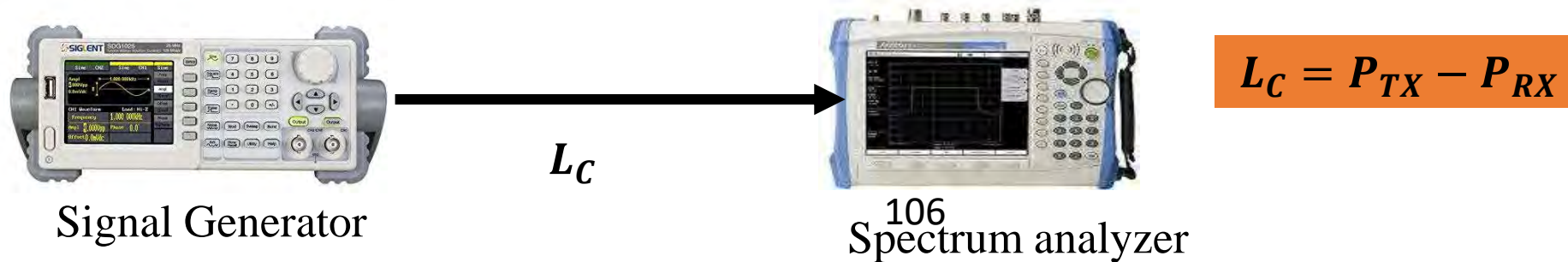
☐ Uplink success rate

Calibration Setup

1. Radio Transmission Output



2. Cable Loss

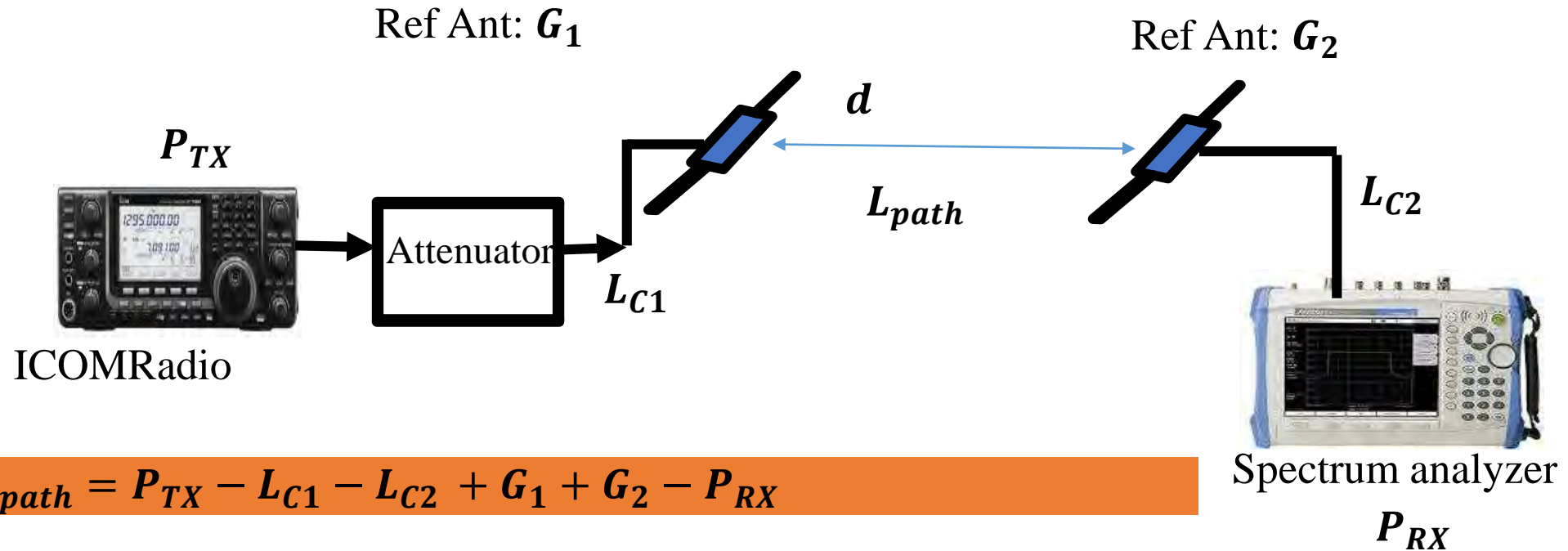


3. Attenuator Functionality Checked



Determining the Path Loss

1. Practical Path Loss

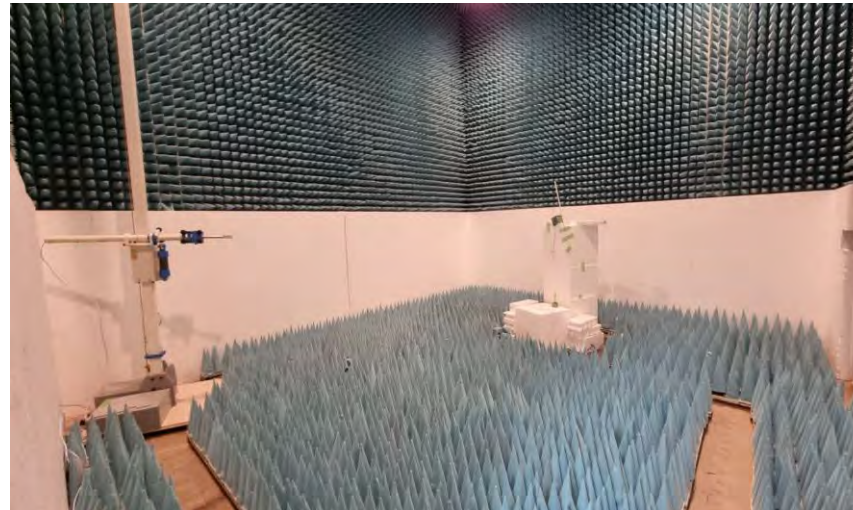
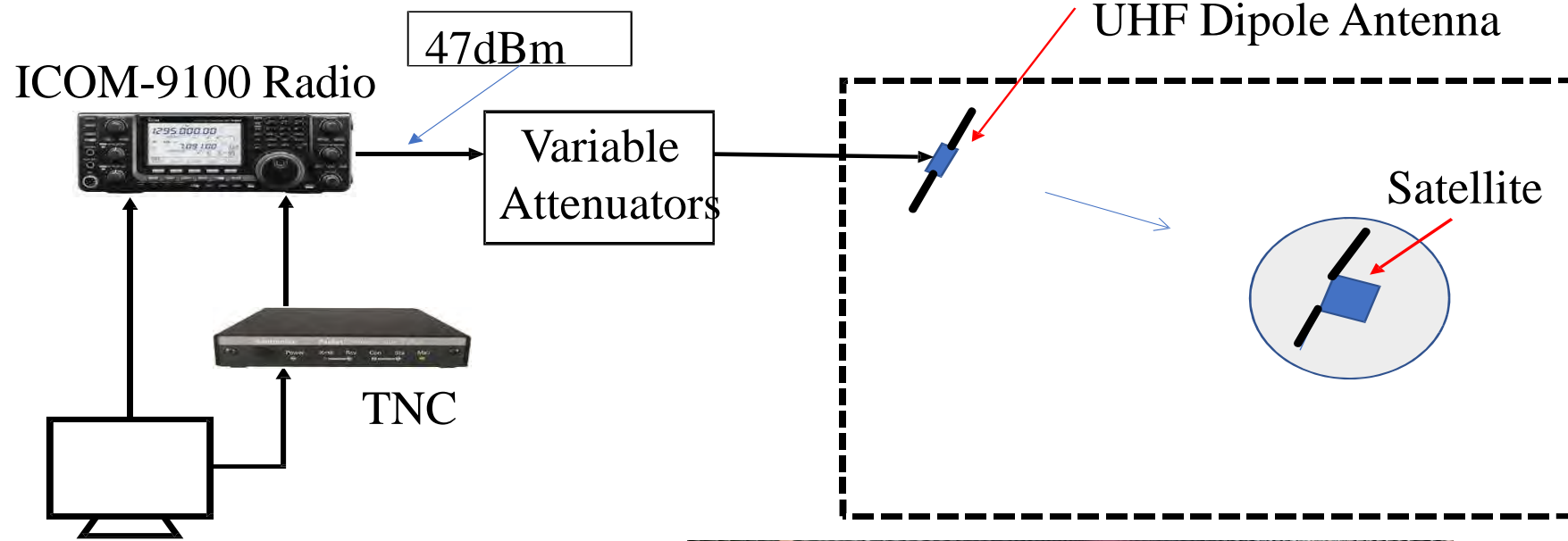


2. Theoretical/Ideal Path Loss

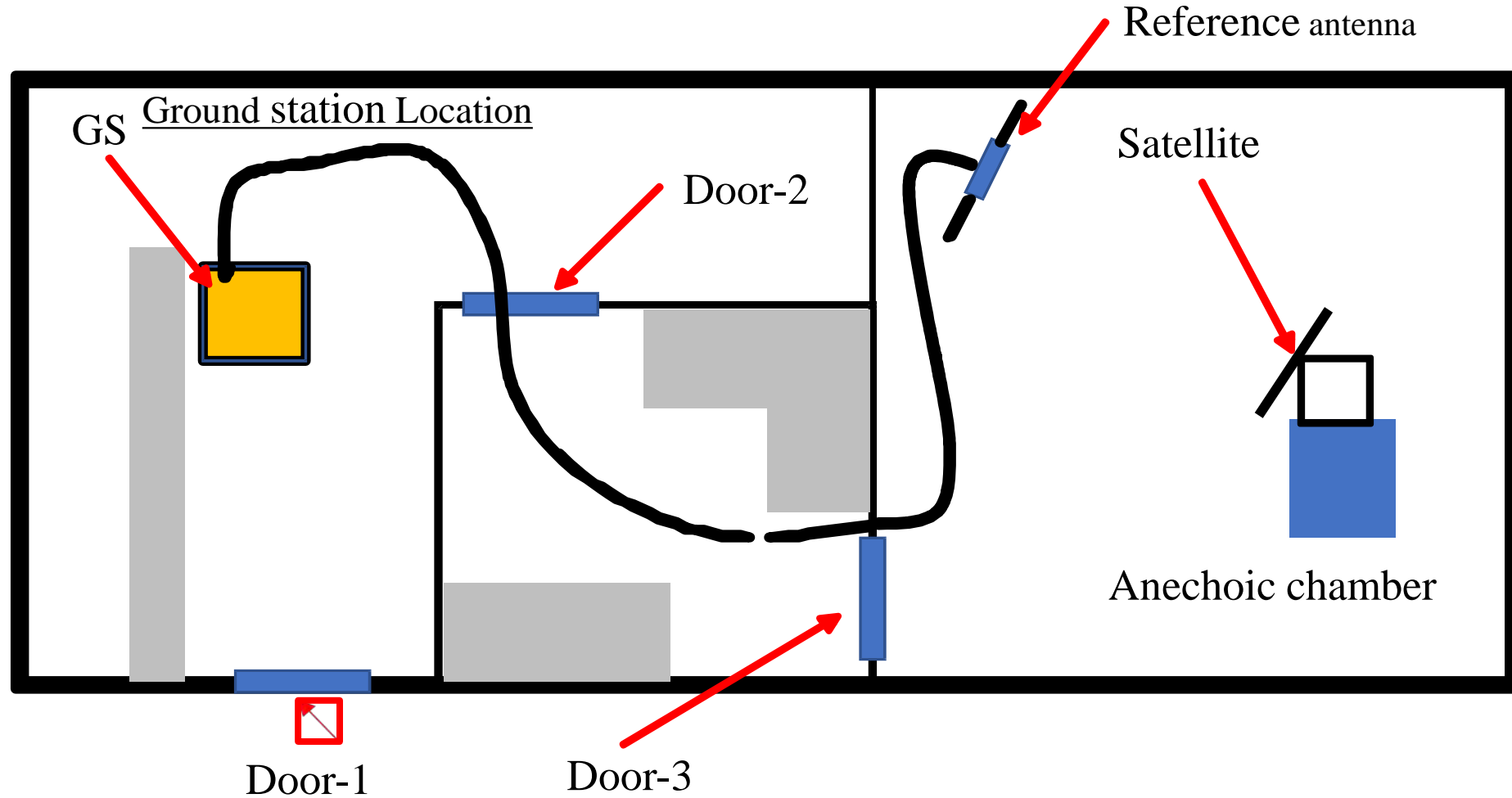
$$L_{path} = 20 \log \left(\frac{4\pi df}{c} \right)$$

- Where: f: Freq, c: Speed of light, d: distance between the two antennas

Measuring UHF TRX Sensitivity SetUp



Measuring UHF TRX Sensitivity Test Setup



END

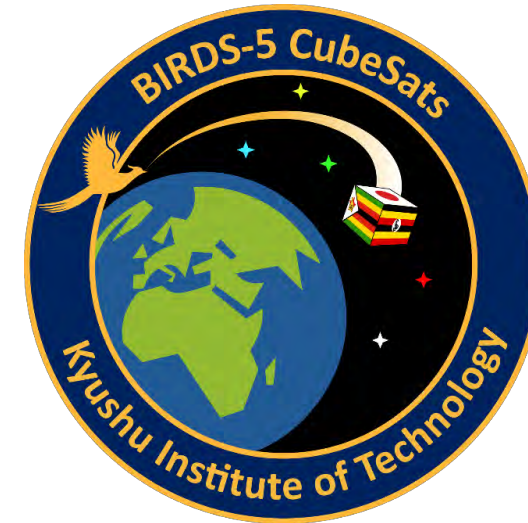
19. BIRDS-5: ADCS flight model test setup



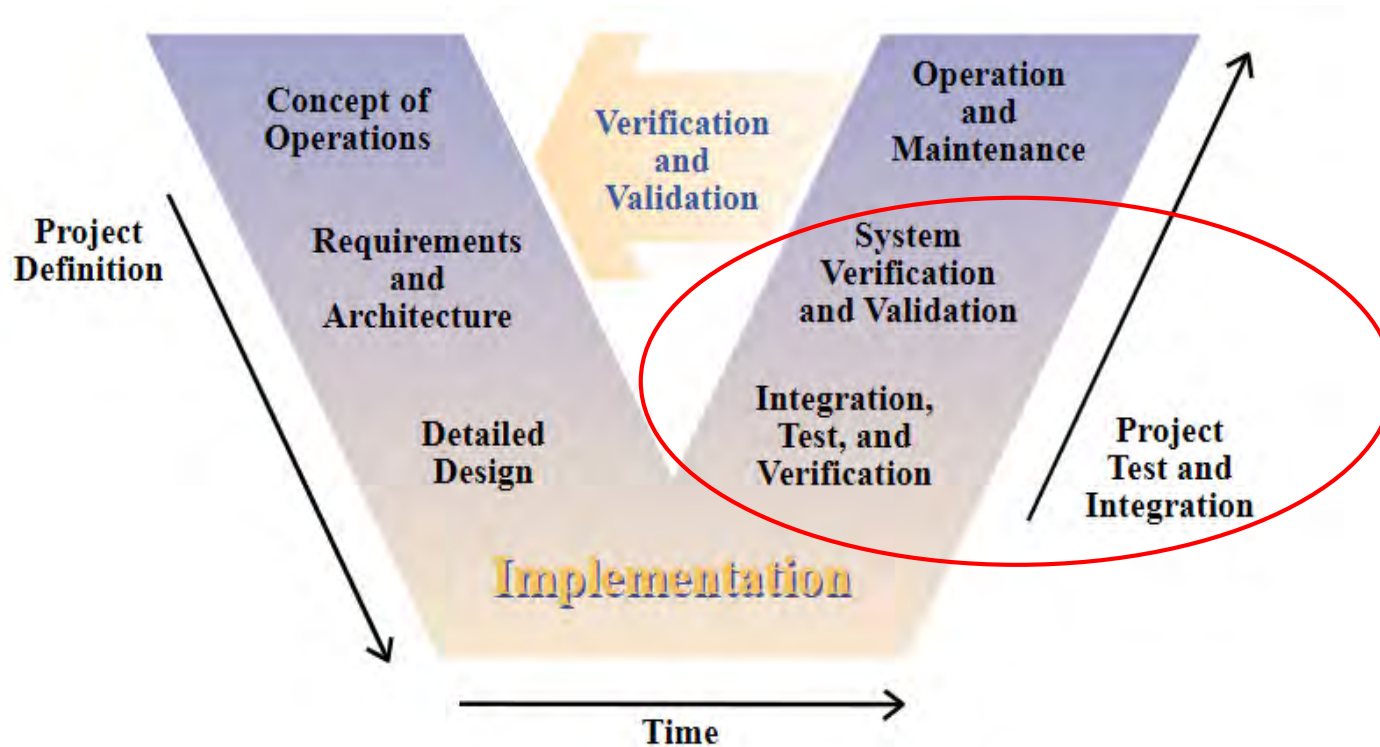
By : Timothy Kudzanayi Kuhamba
(Zimbabwe)

Date: 20 January 2022

ADCS FM Test Up



V Engineering model



- Validation.**

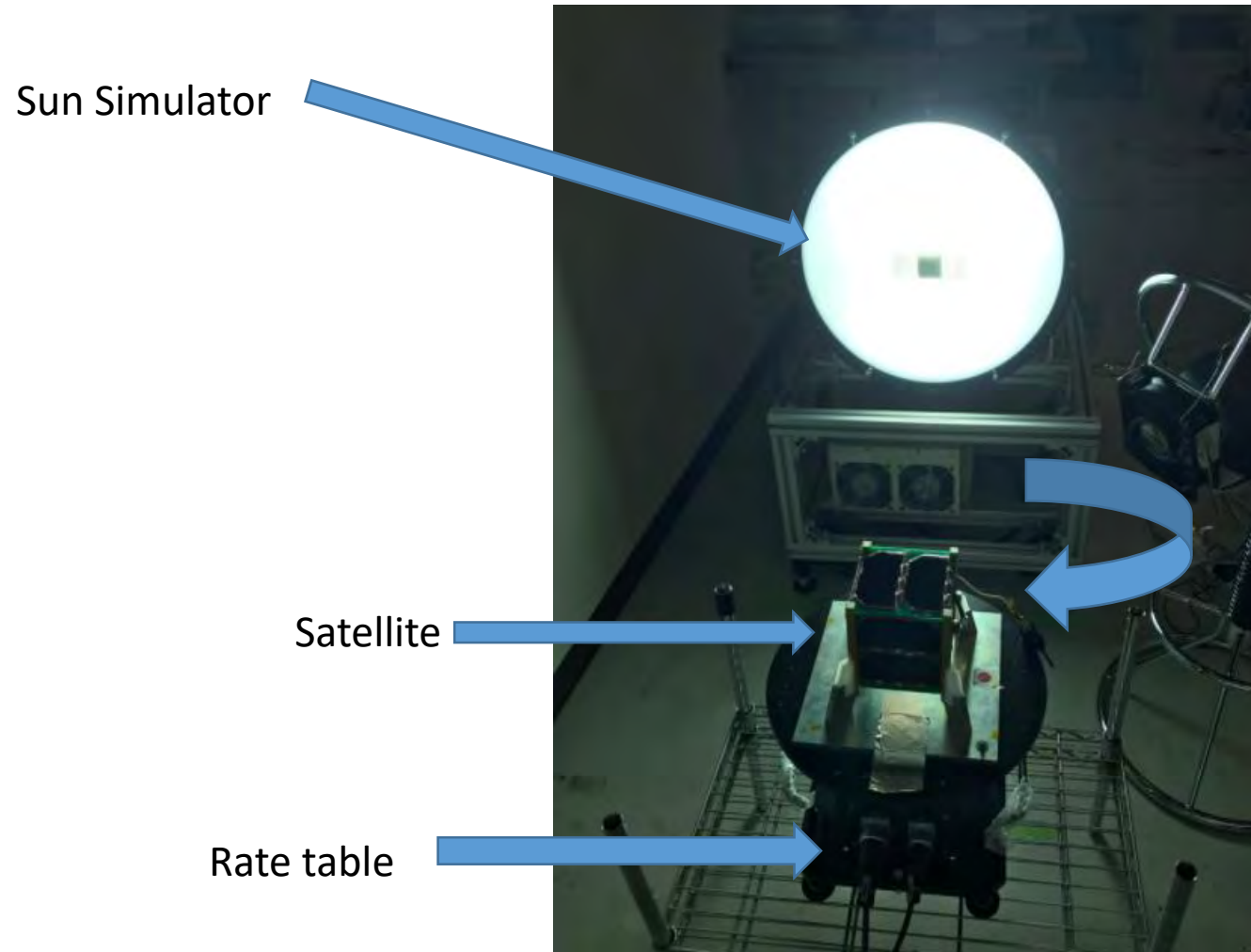
- system meets the needs of stakeholders.

- Verification.**

- The evaluation of system complies requirement

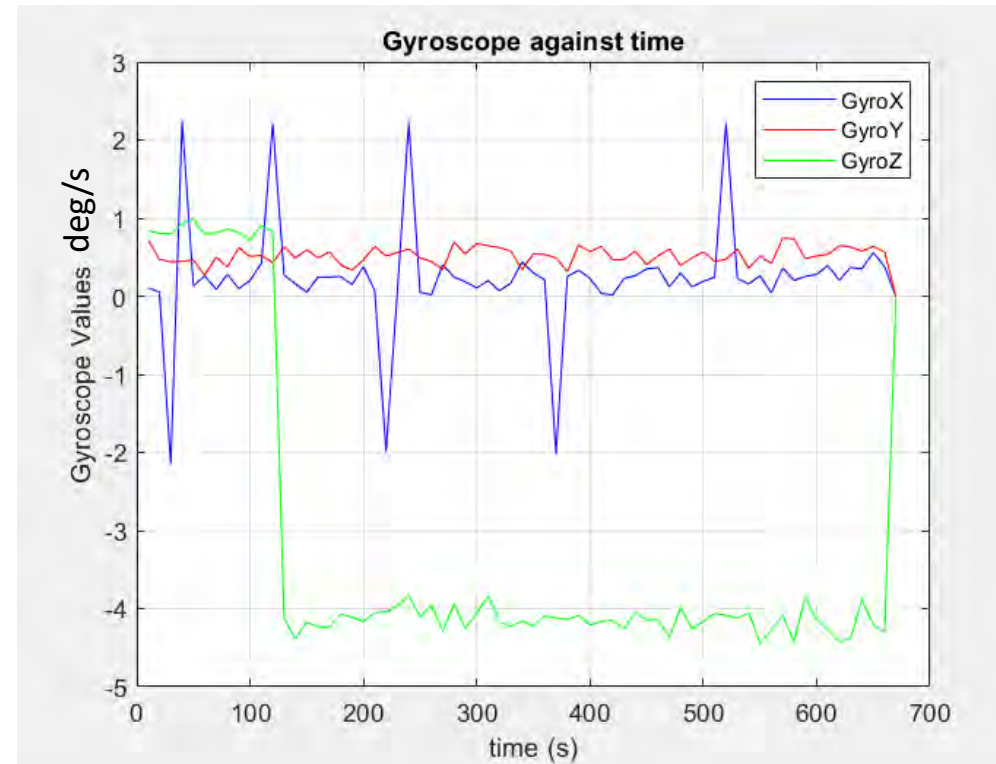
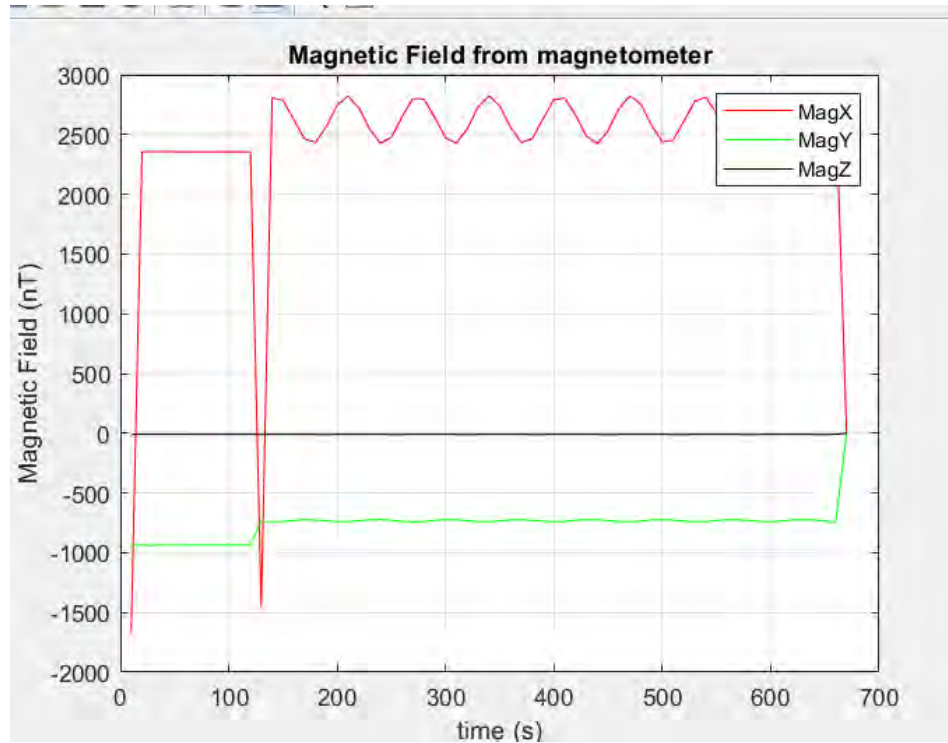
https://upload.wikimedia.org/wikipedia/commons/e/e8/Systems_Engineering_Process_II.svg

Test Set Up



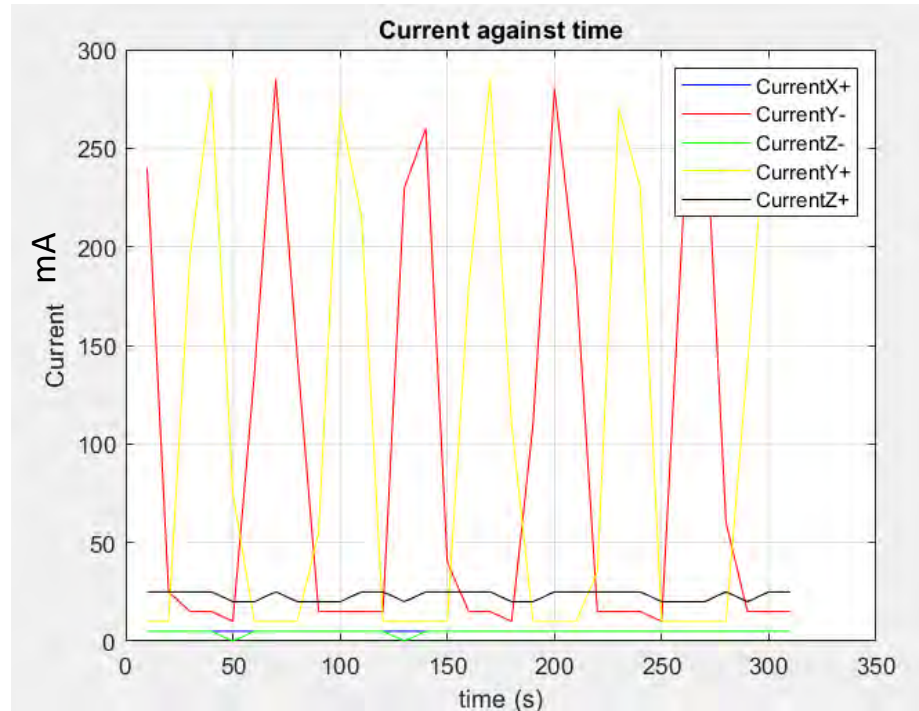
- Rotate the rate table
- Collect high sampling data using ground station
- Check conscience of results magnetometer gyroscope ,Solar current
- Plot the data

Magnetometer Plots

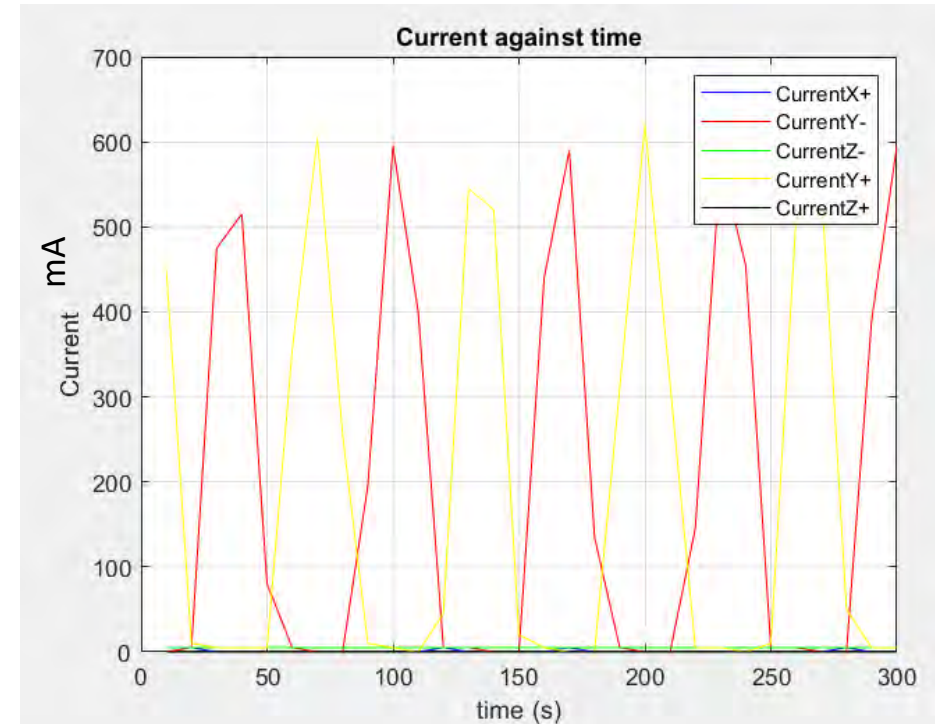


Sample plots

Current Plot



1U satellite



2U satellite

High sampling data plots for 5 minutes

20. BIRDS-5: Calibration of flight model magnetometer

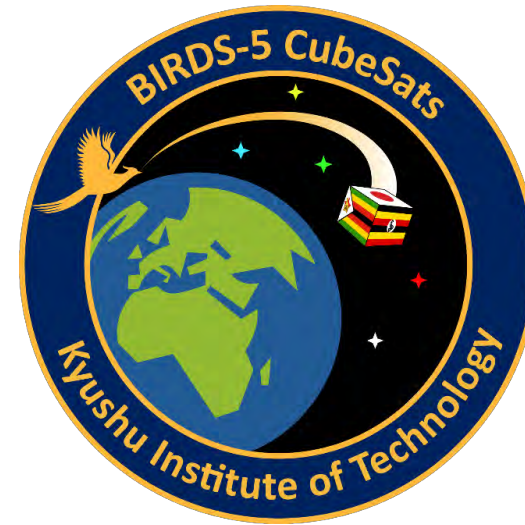


By : Timothy Kudzanayi Kuhamba

(Zimbabwe)

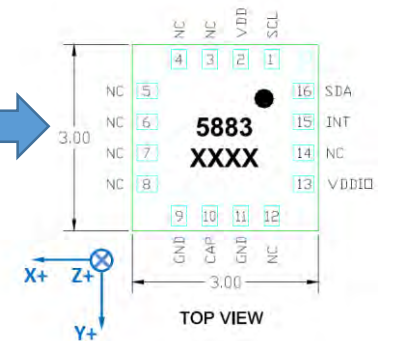
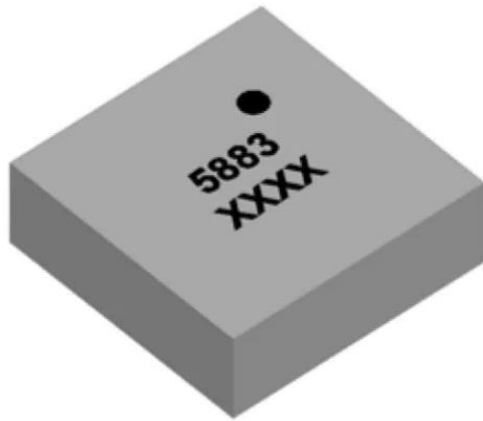
Date 20 January 2022

FM Magnetometer Calibration



What are magnetometers ?

- Instruments to measure the strength and direction of magnetic field



BIRDS 5 Magnetometer

In BIRDS 5 Magnetometer measurements will be used to calculate the attitude of the satellite

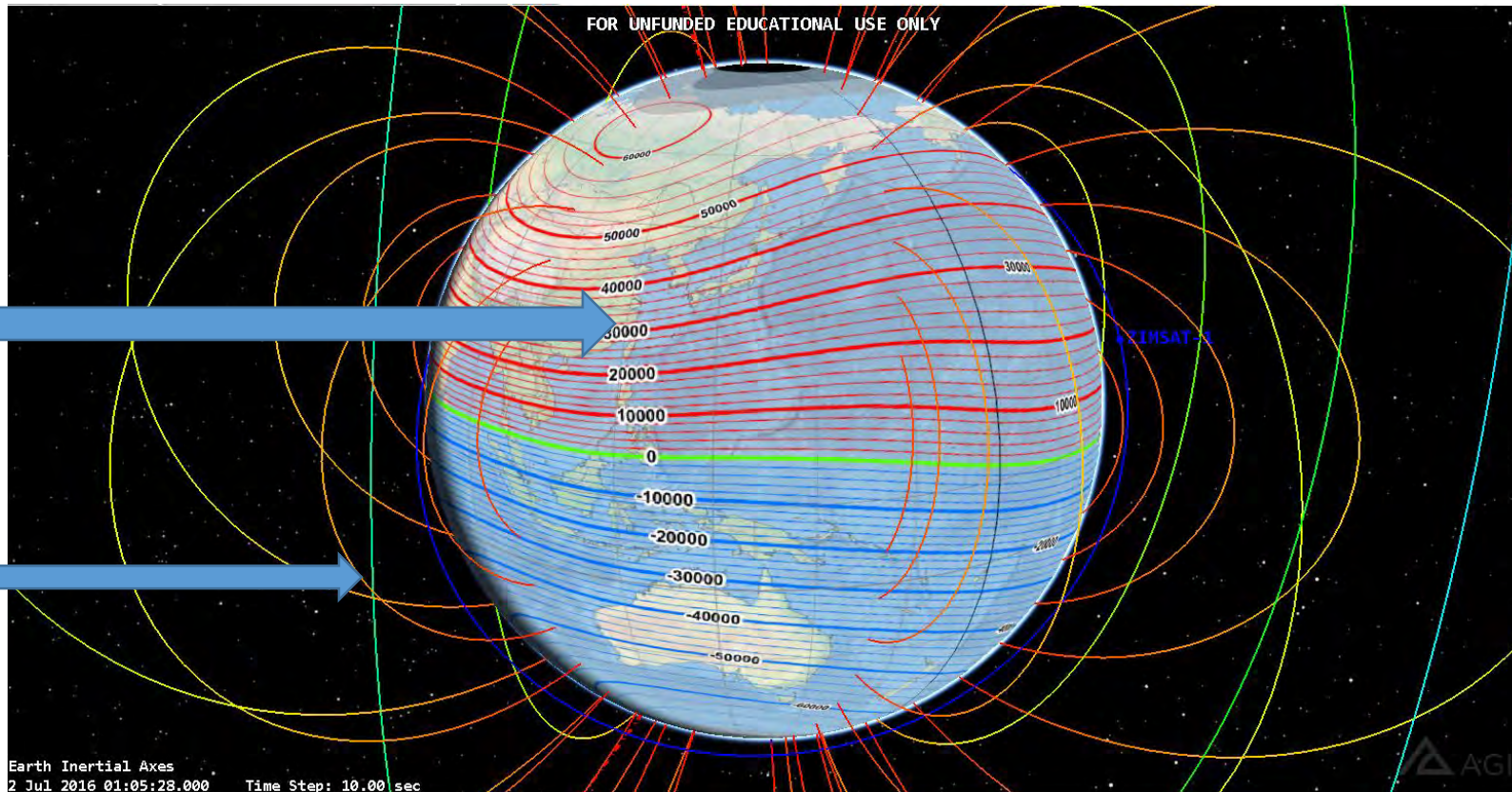
https://www.youtube.com/watch?v=c--Yiz_7_MM&t=3991s

Magnetometers

- Used to determine the attitude of the satellite comparing measured value and calculated earth magnetic field model at the position of the satellite

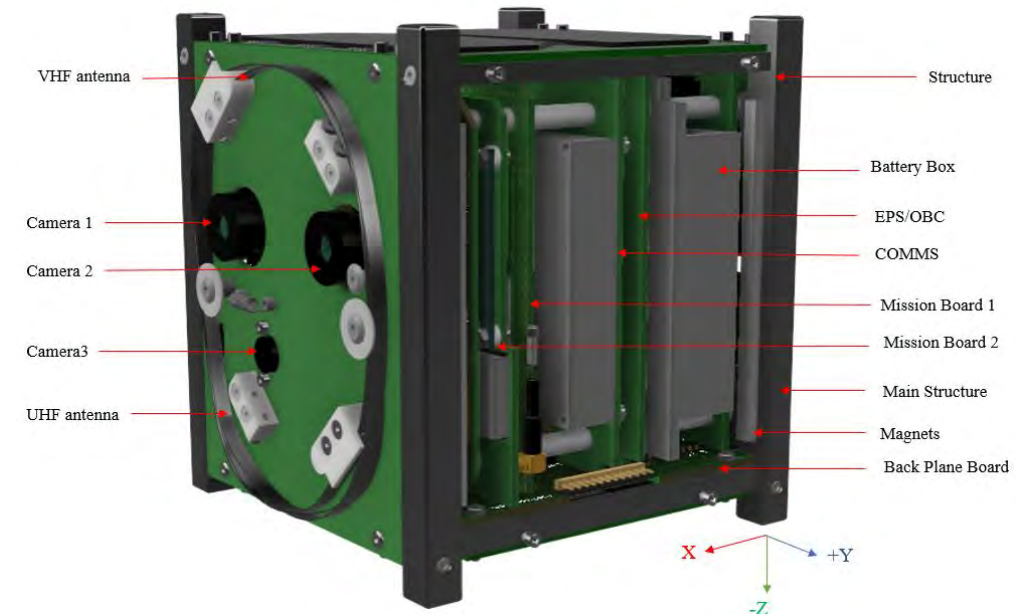
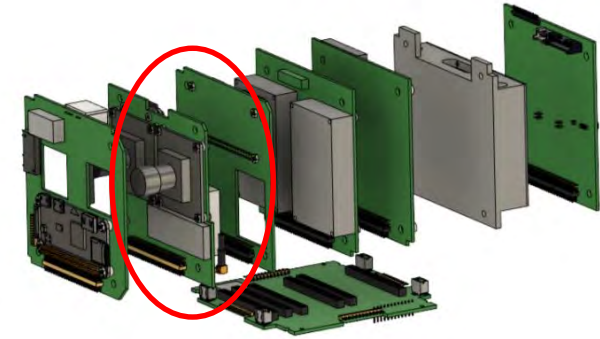
Magnetic
Field
Model
values

Magnetic
Field lines

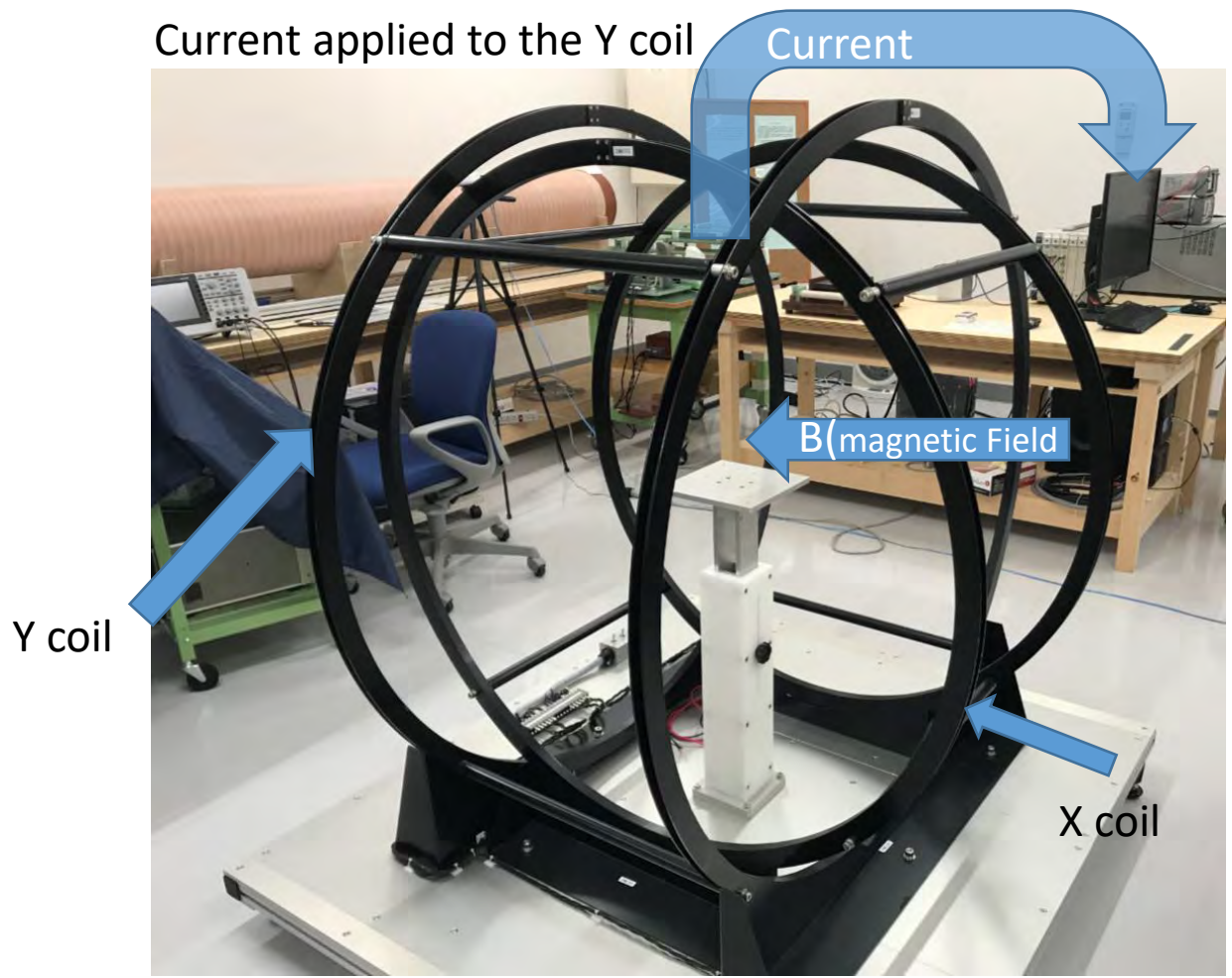


Why calibrate magnetometers

- Very subject to errors
- To understand the
 - hard iron errors from permanent magnets
 - Errors from the electronic boards
- Calibration help
 - to correct errors?
 - Get true measurements of magnetic field
 - Improves accuracy determining attitude of satellite



2 Axis Helmholtz coil



Helmholtz coil used to calibrate magnetometer

| | |
|----------------------------|--|
| ●概要 | コイルの磁気特性測定を行う装置です。 |
| ●型 式 | 東洋磁気工業（株）製 TCC-17222 型 |
| ●仕 様 specification s | 2Dimensions Helmholtz coil Generate the magnetic field up to 0.5mT (@50Hz) or 0.1mT (@1000Hz) X-Axe: Coil diameter:1100/1170mm, Coil distance:550mm, 29 or 90turns Y-Axe: Coil diameter:1200/1270mm, Coil distance:580mm, 17 or 68turns Accuracy : ±0.5%, Φ200mm×200mm (center area of two coils) Stage : 200×200mm, Movable range: 100mm downward from center Frequency range : DC~1000Hz |

$$B = \left(\frac{4}{5}\right)^{\frac{3}{2}} * \frac{\mu_0 NI}{R}$$

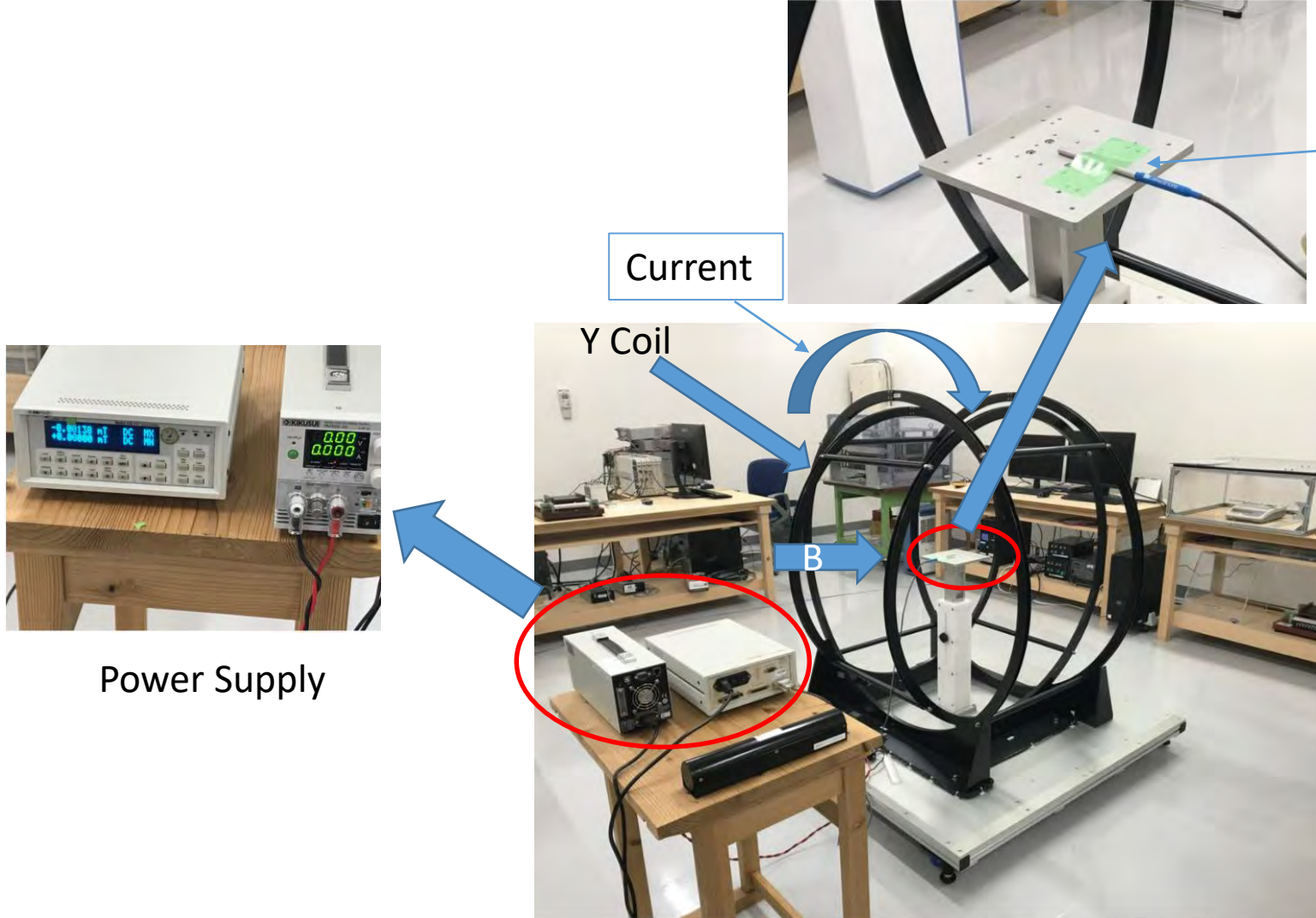
Where:

- radius/coil separation (R)
- magnetic field (B)
- required current (I)
- number of turns (n)

Methods

- Record the current values of the target magnetic field from the gauss meter
- Adjust the gauss meter with the magnetic field until you get maximum e.g
- Set to 10000nT and make sure you align the gauss meter and fix the position
- Record the ambient magnetic field with the gauss meter with 0 current
- Range of test -60000nT to 60000nT so current corresponding to the magnetic field are recorded
- The satellite is set inside and Helmholtz coil and note the axis of the satellite
- Make sure the magnetometer is at the centre of the coil
- Set the satellite aligned to the magnetic field where you get the maximum magnetic field

Gauss meter



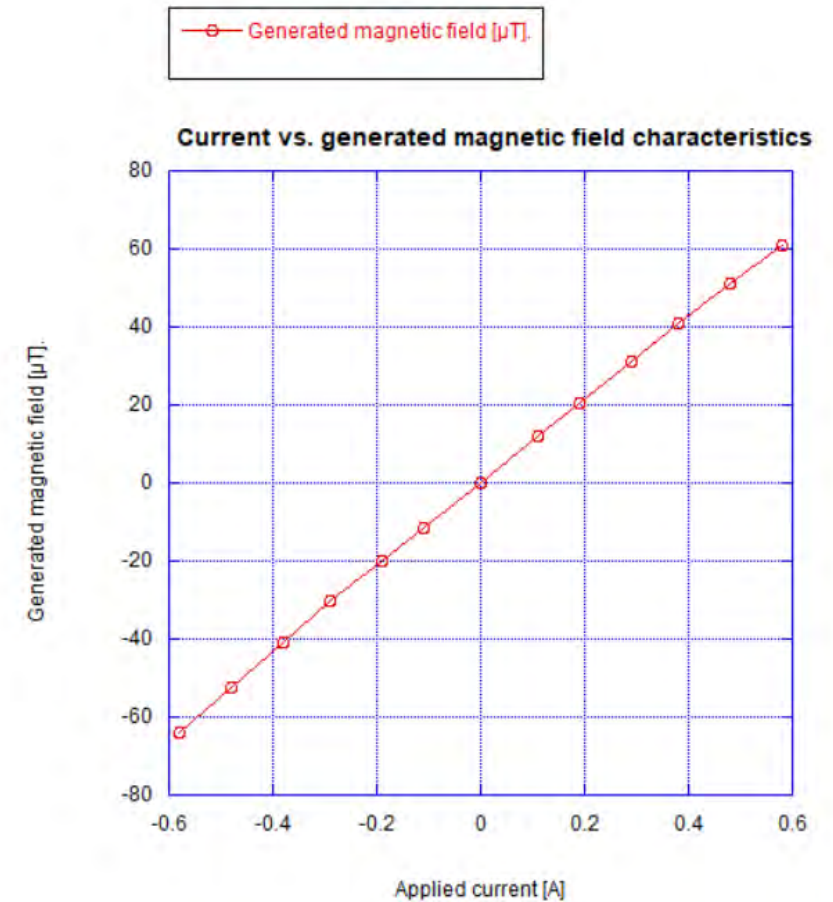
Gauss meter

Current

Y Coil

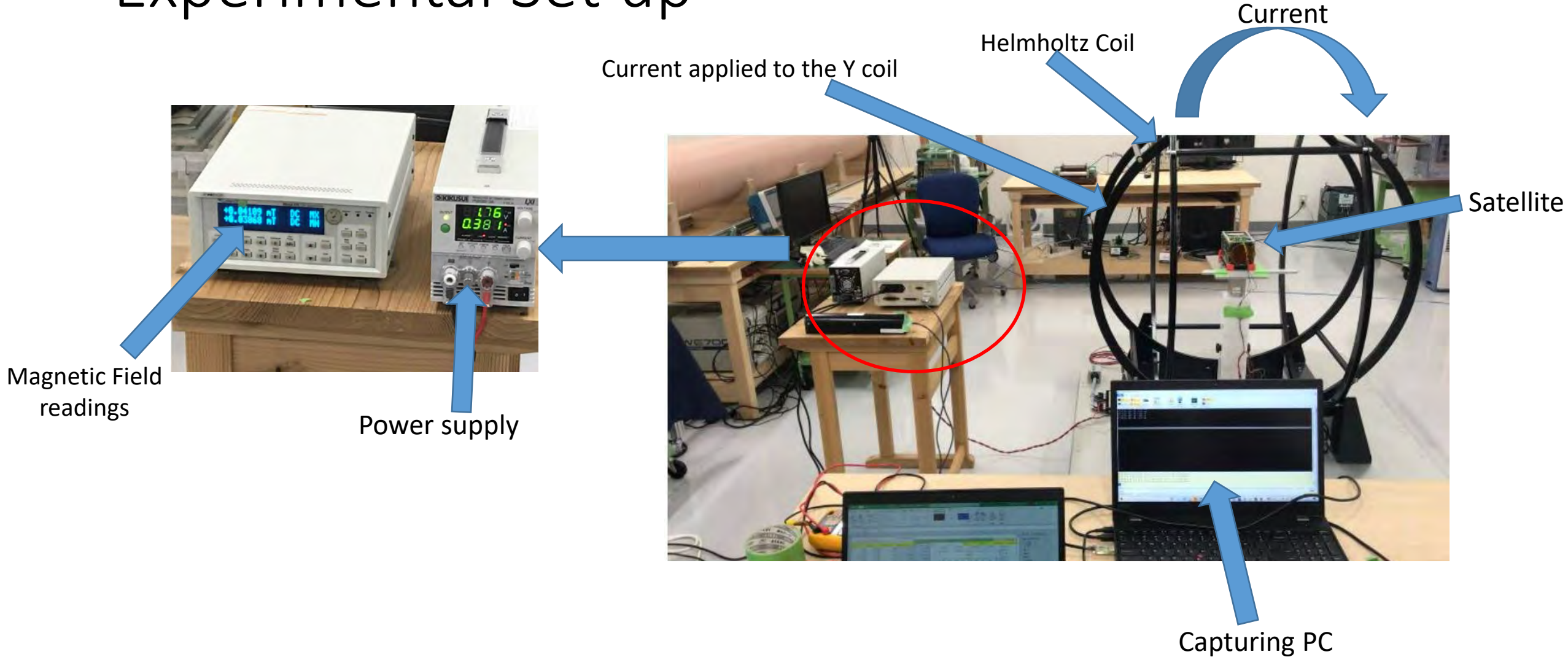
B

Power Supply



Measurement of the ambient magnetic field with zero current

Experimental Set up



Magnetometer Calibration

$$y = ax + b \quad \text{Equation 1}$$

Where:

- x: Input to sensor (Applied Magnetic Field):
- y: Output from sensor (Measured magnetic field):

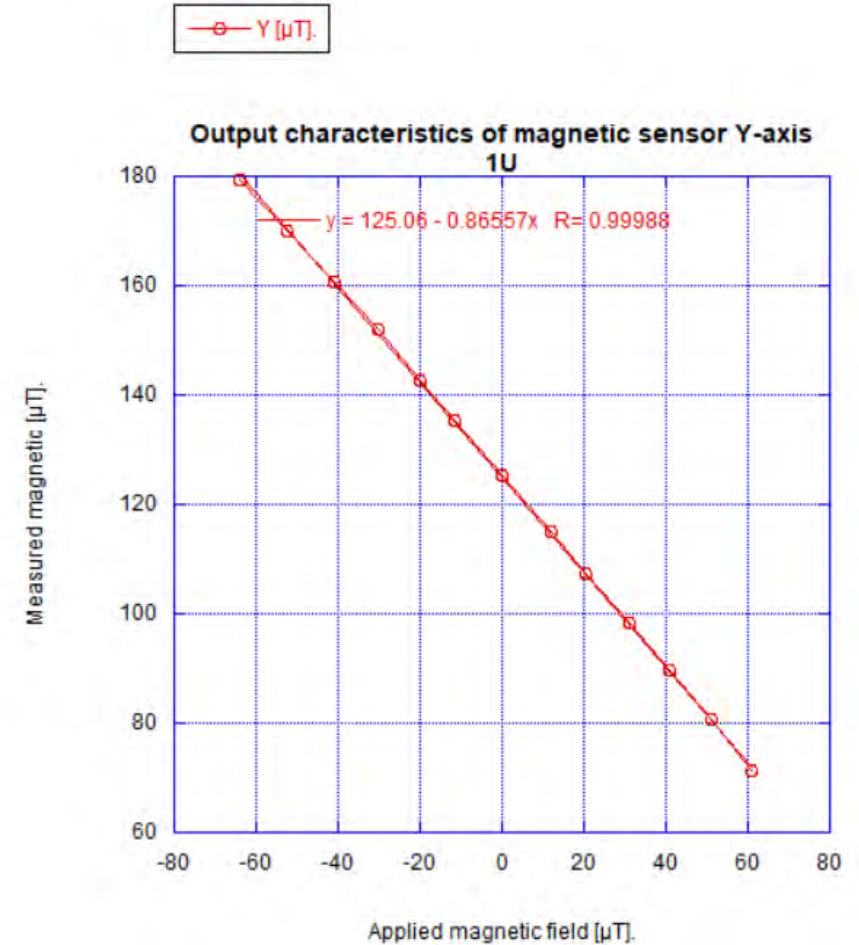
- a: gradient (slope)

- b is the Offset (intercept)

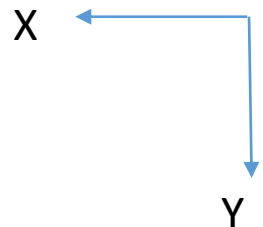
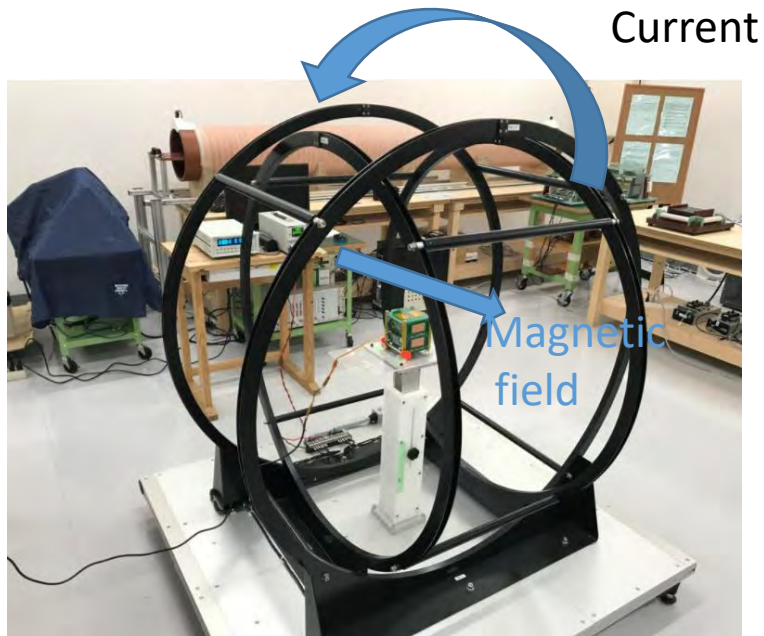
- $y'_{calibrated} = \frac{y-b}{a} = x \quad \text{Equation 2}$

$$y = 125.06 - 0.86557x \quad \text{Equation 4}$$

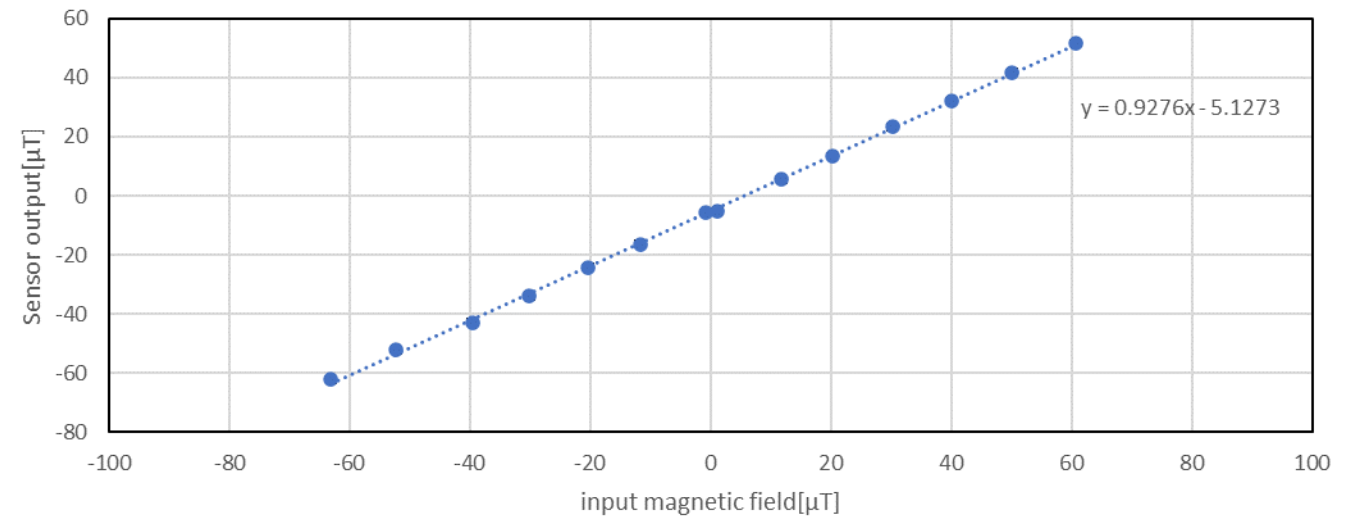
$$y'_{calibrated} = \frac{y-b}{a} = \frac{(-287.2-125.1)\mu T}{0.87} \quad \text{Equation 5}$$
$$= 62.1\mu T$$



Sat 1 X axis



X axis input-output characteristic

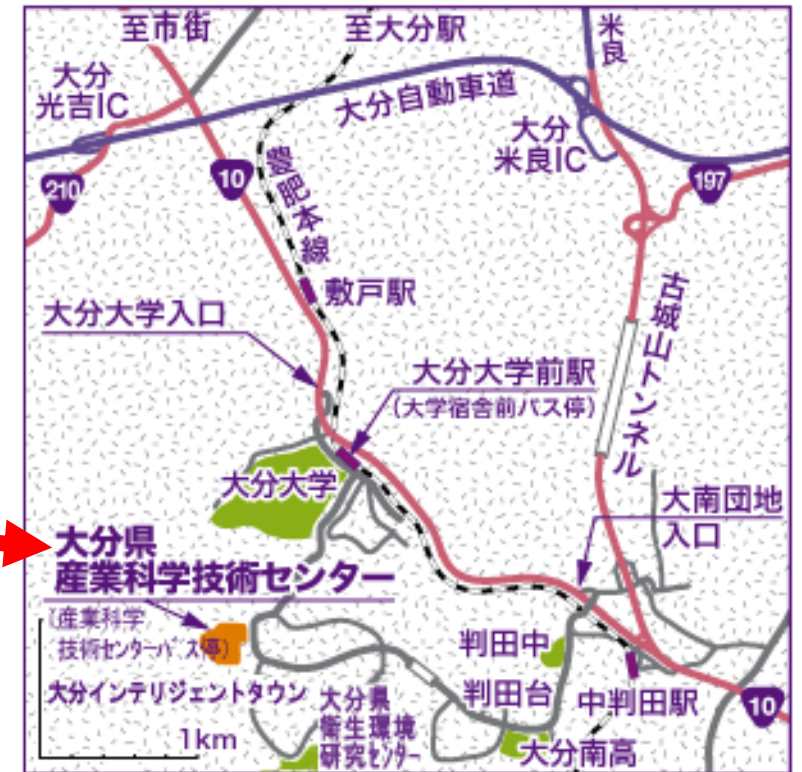


Measured field is linear with respect to the applied field



大分県産業科学技術センター

<http://www.oita-ri.jp/>



These magnetic measurements were made in Oita Prefecture at this industrial test facility.

Dishes in Oita Prefecture



Indian dish



Famous Oita beef

End of Timothy's report

End of BIRDS-5 reports for this month



21. Space forecasts from Euroconsult

The following was received from Euroconsult on 21 Jan 2022

To start the year, Euroconsult is pleased to announce the release of the original "Space Economy Report<<https://digital-platform.euroconsult-ec.com/product/space-economy-report/>>" for 2021
To wish you the best for 2022, I am sharing with you some key findings of this edition:

- * **The global space economy is estimated at a total value of \$370 billion in 2021, consisting of:**
 - * The space market (\$337B in 2021) which includes commercial space revenues and government procurement for their space activities contracted to the private sector, and
 - * Other spending from government organizations (\$33B) to conduct their space activities (internal costs and R&D)
- * **The space economy is expected to grow by 74% by 2030 to reach \$642B** (6.3% CAGR) renewing its strong growth pattern following a 4% decrease in 2020 under the effect of the covid crisis impact on commercial space services
- * The global space market is valued at \$337B in 2021 up 6% v. 2020, i.e., market value comparable to 2019 prior to covid crisis which impacted satellite service revenues in 2020. The largest revenue drivers remain satellite navigation and communications which account for 50% and 41% of the total market value respectively, driven by B2C applications. In comparison, EO still accounts for a marginal 5% of the total value but with a much higher proportion upstream. Satnav has surpassed satcom, growing from about 37% of the total revenues in 2016 to over 50% in 2021, largely due to services enabled by GNSS services and their related devices.

End of this **BIRDS Project Newsletter**

(ISSN 2433-8818)

Issue Number Seventy-Two

This newsletter is archived at the BIRDS Project website:

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

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