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, and -4, on 29 Nov 2018 in front of the lab building

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

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

ISSN 2433-8818

BIRDS Project Newsletter

Issue No. 54
(22 July 2020)

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

Space Engineering International Course

All back issues of this newsletter can be easily downloaded.
Go to here: http://birds1.birds-project.com/newsletter.html and scroll down to the desired issue.

Table of Sections

Continued on the next page

From Morocco **The Guest Box**

Chefchaouen (locally called *Chaouen*) or the “Blue Pearl”, registered on the UNESCO cultural heritage list, is one of the most famous (and instagramable) cities in the world for its blue-rinsed houses and buildings.

CONTINUED ON NEXT PAGE

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

End of Table

This Moroccan city, situated in a mountainous region, is the best destination to disconnect totally from the outside world : get lost between its streets, drink Moroccan tea made from the local water source, and let yourself be carried away by the Mediterranean flavors of Moroccan gastronomy! #VisitMorocco #VisitChefchaouen

Find below a 20 min-POV-Video of the town, and if you like pop music, check the video clip made by French Montana for his song "Famous" !

https://www.youtube.com/watch?v=uNhnHVYuqwQ
(20min POV video)

https://www.youtube.com/watch?v=LNHkxOU7zz8
(French Montana Clip – Famous)

-- by MOUMNI Fahd (BIRDS-5, Morocco)

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 Int'l Workshops and for Ground Station Workshops.

It would help us a lot.

01. Akagi-san (JAXA) receives “2020 IAF Young Space Leaders” recognition

INTERNATIONAL ASTRONAUTICAL FEDERATION

Connecting @ll Space People

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THE 2020 IAF YOUNG SPACE LEADERS:

The future of the space industry strongly depends on a motivated next generation to continue the progress and drive further developments in designing new space technologies, exploring new ideas and building worldwide connections. Through various activities and programmes the International Astronautical Federation (IAF) commits to include and inspire young minds who are active in the space field and acknowledge their contributions and achievements.

To this end, the IAF has established the **IAF Young Space Leaders Recognition Programme** that recognizes exceptional students and young professionals who demonstrate leadership in their academic or early careers and we are very excited to announce the **2020 IAF Young Space Leaders:**

http://www.iafastro.org/to-announce-the-2020-iaf-young-space-leaders/

Hiroki Akagi

Deputy Director

JAXA Houston Office

Japan Aerospace Exploration Agency (JAXA)

The other 2020 winners of IAF *Young Space Leaders* recognition

Chiara Cocchiara

System Operations Engineer working as Staff member at EUMETSAT, the European Organization for the Exploitation of Meteorological Satellites

Luis Ferreira

Strategist at Airbus Defence and Space

Emmanuelle David

Executive Manager of the EPFL Space Center

Arnau Pons

Chair of the Space Generation Advisory Council in support of the United Nations Program on Space Applications

Please find the full biographies of the 2020 IAF Young Space Leaders at iafastro.org and learn more about these inspiring young minds.

Congratulations to all and best --
Regards,
IAF Secretariat

Bruno Sarli

Aerospace Engineer, contractor at NASA Goddard Space Flight Center

INTERNATIONAL ASTRONAUTICAL FEDERATION

Connecting @ll Space People

← YSL medals

02. BIRDS-4: Status meeting

First slide of the meeting presentation file

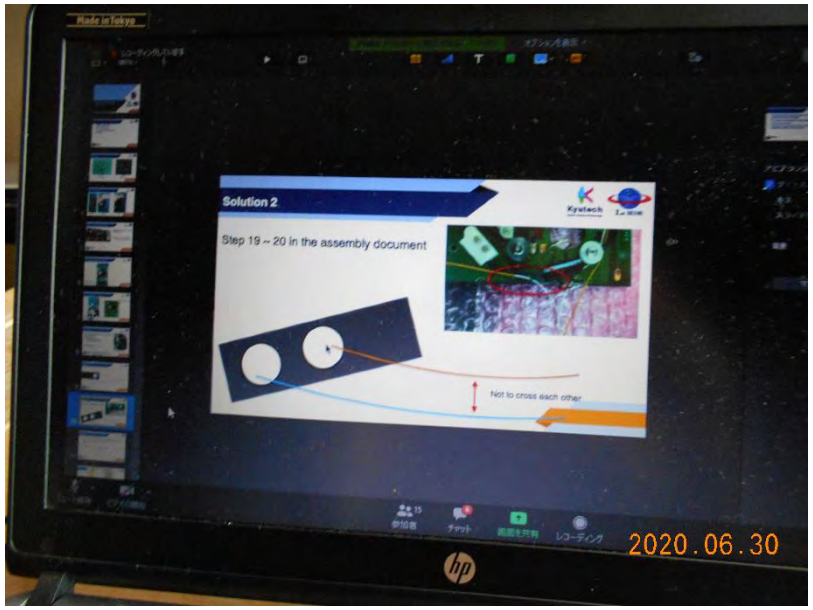
NOTE: Long Duration "Test 2" is planned for 22 June through 17 July 2020.

Meeting via ZOOM

During 10AM～01PM on 30 June 2020, the BIRDS-4 team conducted a status meeting (via ZOOM) regarding the flight models. Fifteen students and staff participated.

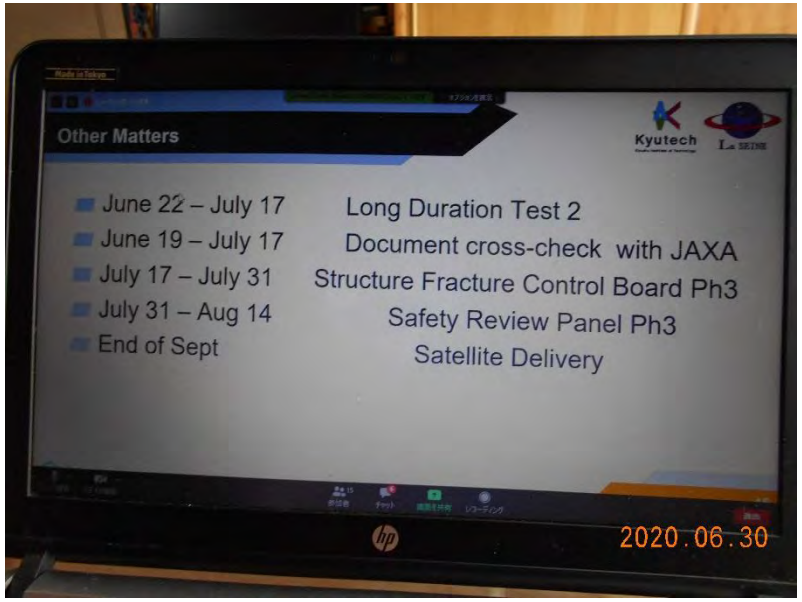
Adolfo and Anibal participated in this meeting from Paraguay.

CONT'D NEXT PAGE



Various technical issues were raised and analyzed via ZOOM group meeting for three hours.

Next status meeting will be in July.



END OF THIS SECTION

03. A new document: Introduction to BIRDS

This document consists of 21 pages.


BIRDS
International
Capacity Building Platform

革新的宇宙利用実証ラボラトリー
Laboratory of Lean Satellite Enterprises and In-Orbit Experiments

Sangkyun Kim

1 July 2020

Kyushu Institute of Technology

DOWNLOAD THIS NEW DOCUMENT FROM HERE

https://kyutech-laseine.net/english/download.html

04. A new document: Introduction to SEIC

This document consists of 38 pages.

SEIC Space Engineering International Course

Kyutech Kyushu Institute of Technology

DOWNLOAD THIS NEW DOCUMENT FROM HERE

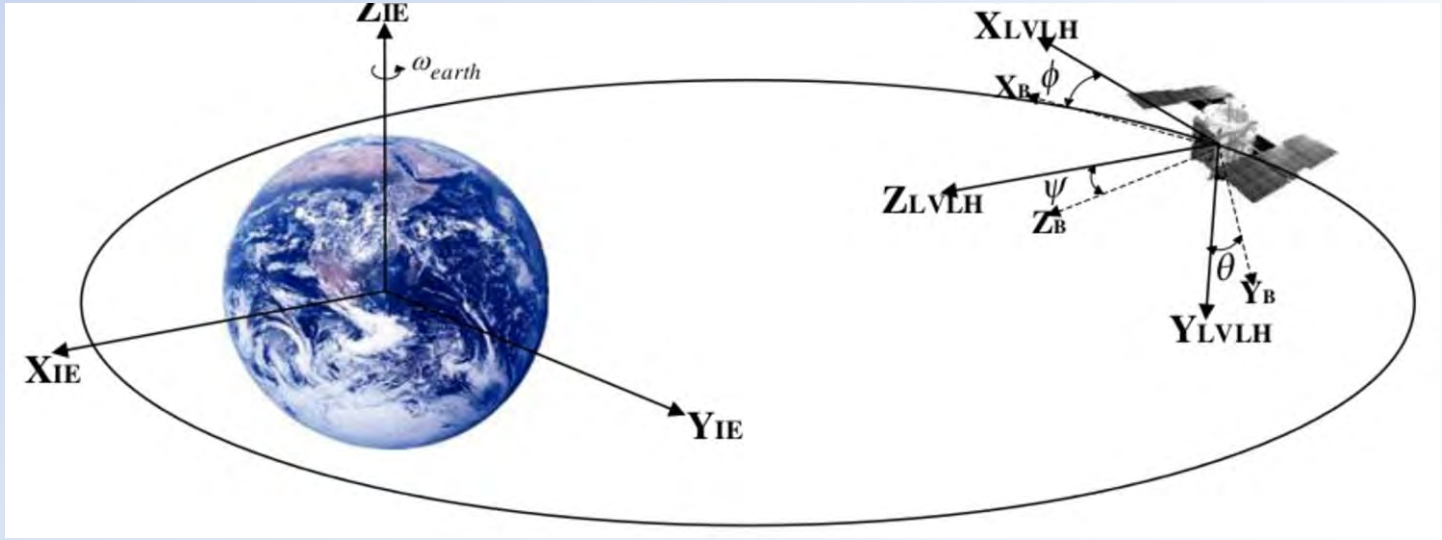
https://kyutech-laseine.net/english/download.html

Attitude Determination and Control System (ADCS) of BIRDS

by
Dulani (BIRDS-3, Sri Lanka)
Timothy (BIRDS-5, Zimbabwe)
07 July 2020

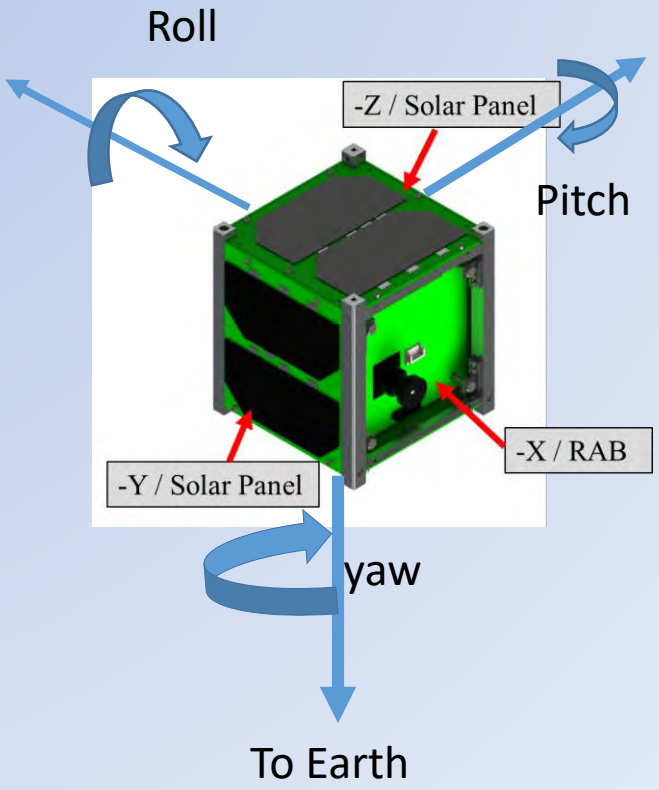
INTRODUCTION

- Satellite has different subsystems. Attitude Determination and Control is one of them .
- Attitude of the satellite can be determined and can be controlled.
- The antenna needs to be pointed towards the ground station for effective and efficient communication



cJuliana Ismail

What is attitude ?



Attitude is the spacecraft orientation in space
Or
Attitude is the angular rotation with respect to a body centered rotation frame called body frame (satellite)
Normally the attitude is defined in angles

INTRODUCTION

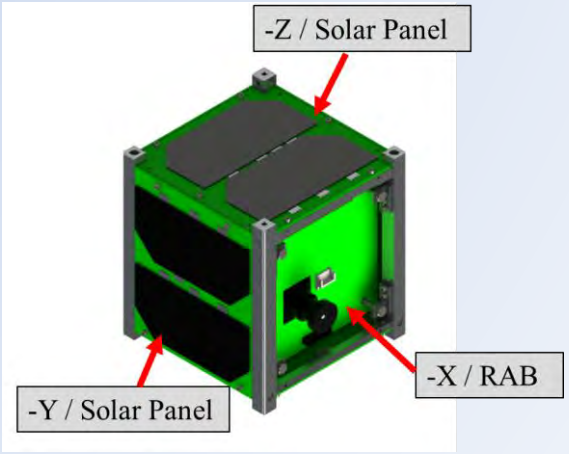
Attitude Stabilization

In satellite missions it is important to reduce the angular velocity

- If the angular velocity is high, communication cannot be done properly
- Some missions such as camera mission will not be successful

Sensors

- **Gyro sensors** measure the angular velocity of the satellite (how much satellite is rotating)
- **Geomagnetic sensor** for measuring magnetic field around the earth
- **Sun Sensors** measuring direction of the sun relative to the satellite (mounted on external panel)



- Using **Sun sensor** and **geomagnetic sensor** you can determine the attitude using TRIAD method

Attitude Determination and Control

Passive Stabilization	Active Stabilization and Control
Doesn’t need any control algorithm or power requirements	Active magnetic stabilization method needs sensors, control algorithm and actuators.
BIRDS 1 and BIRDS 2	BIRDS 3 and BIRDS 4

Difference between Passive and Active Magnet Methods

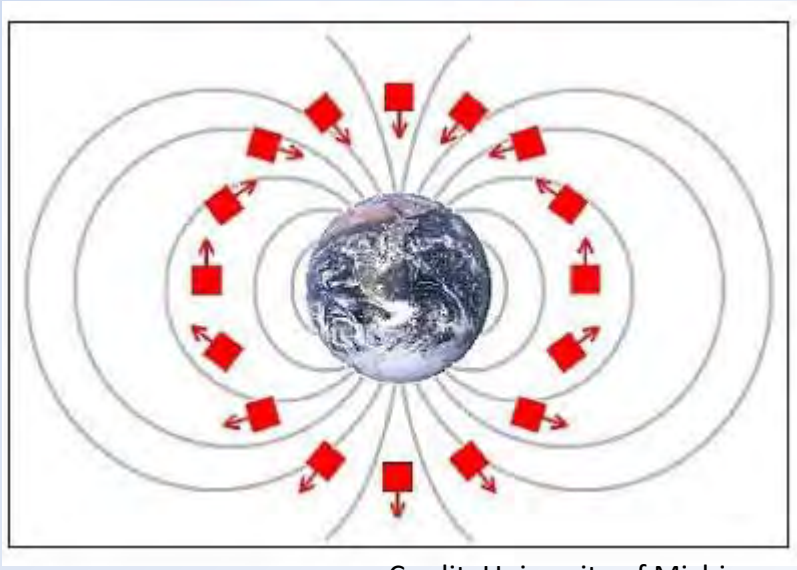
- Passive Stabilization
  - Hysteresis Damper

  - Permanent Magnet
- Active Stabilization and Control
  - Control Algorithm

  - Actuators : Magnetic torquer, Reaction wheels, Thrusters

Passive Stabilization

- BIRDS 1 and BIRDS 2 used a permanent magnet and a hysteresis damper.
- From this method the spacecraft can be aligned with the Earth's magnetic using the permanent magnet.

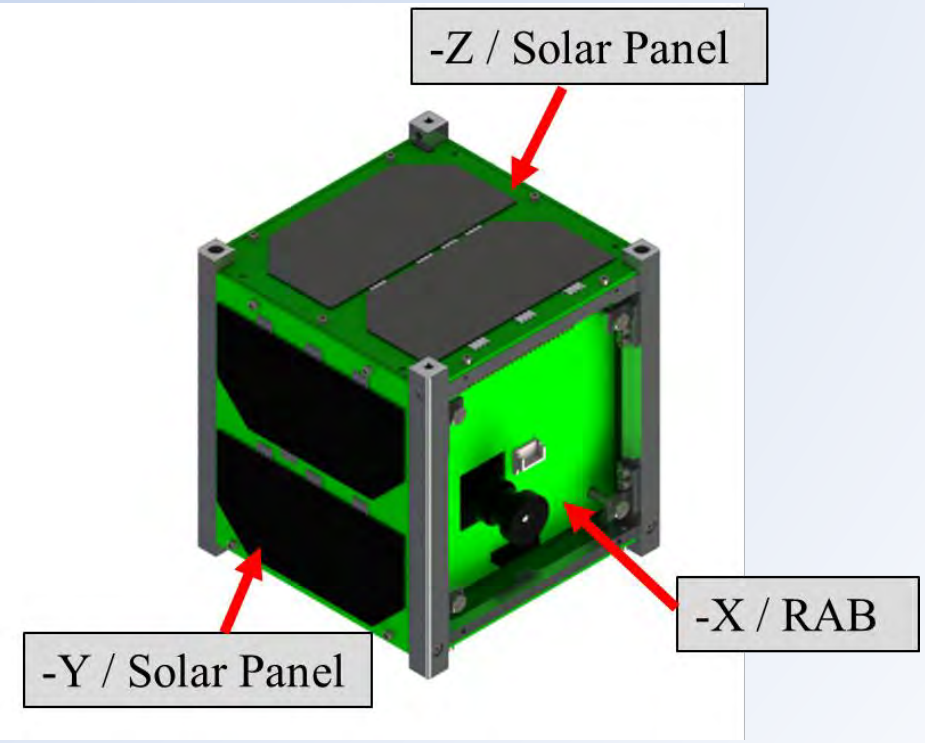


Credit: University of Michigan

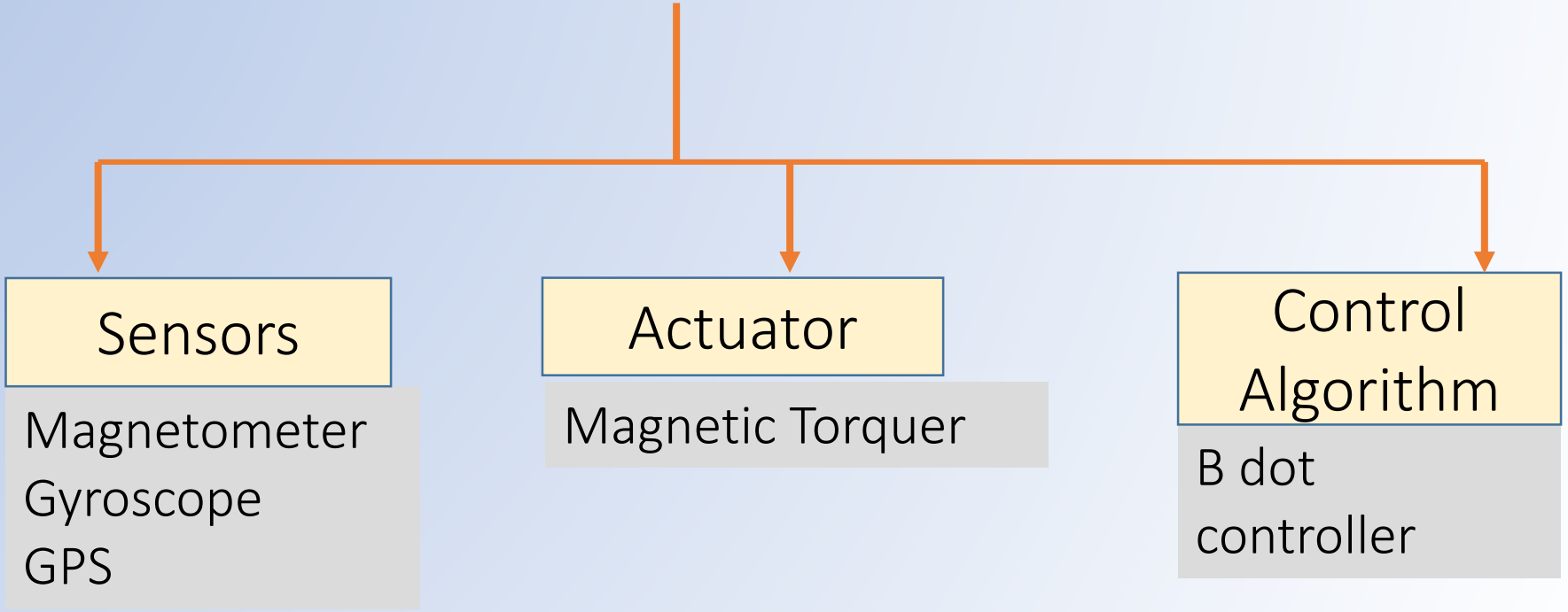
BIRDS-3 System

BIRDS-3 used a magnetic torquer printed in PCBs to stabilize the satellite.

The figure below shows the location of the MTQs.



BIRDS-3 System



How "magnetic torquer" works

Magnetic Torquers

Magnetic torquers produce the magnetic torque which needs to reduce the angular velocity .

$$\tau = M \times B$$

τ: Torque

M: Magnetic moment

B: Magnetic field

B dot algorithm

- Is used to decrease the angular velocity
- Requires magnetic flux density value measured by the magnetometer

END OF THIS SECTION

BIRDS3: Satellite operation report from Mongolia

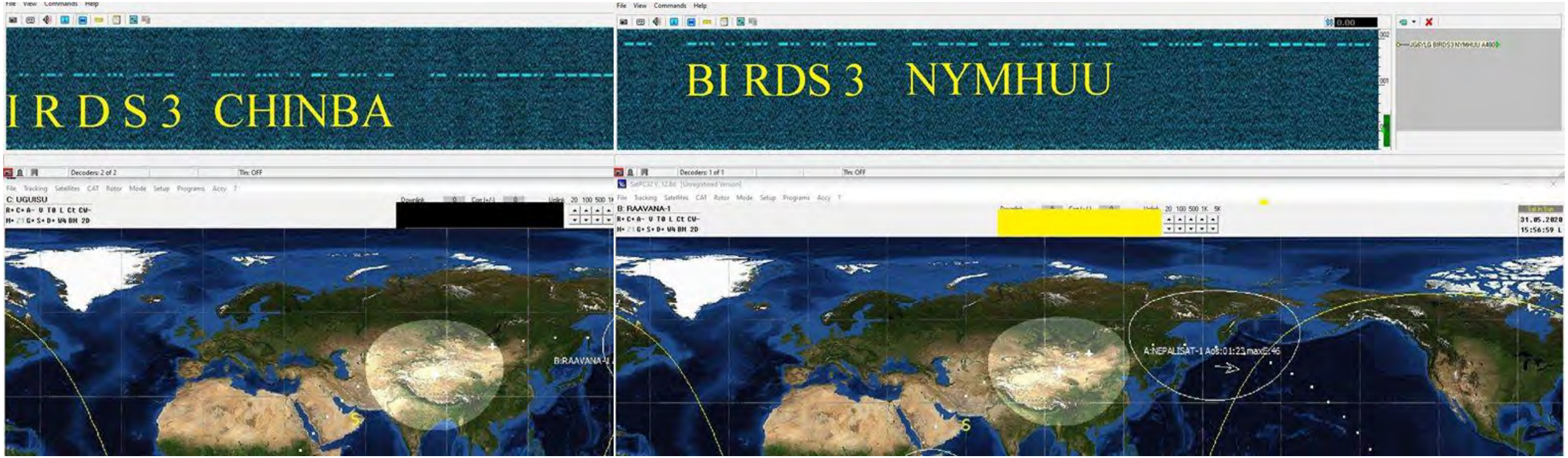
-- by Tuguldur, 5 July 2020

During COVID-19 semi-lockdown, Kyutech was not able conduct satellite operations on a proper scale. Below is some of the BIRDS-3 data collected by NUM ground station during that time.

Date (UTC) Y/M/D	Time (UTC) HH:MM	Call Sign	Nation	From	CW type	Voltage [V]/Gyr	Current [mA]/G	Bat Temp [℃]/G	Operation Mode	Kill Main/Auto C	Kill FAB/Auto LD	Antenna Deploy	Solar +X/Heater	Solar -Y/RSV Ch	Solar -Z/Uplink	Solar +Y/Backpl	Solar +Z	Reset Time	
2020/04/24	3:11	JG6YLE	JP	MNG	1	4.19719	-53.7316	-1.3125	nominal	0	0	1	0	0	1	0	0	16	JP1
2020/04/25	1:45	JG6YLF	NP	MNG	1	4.19719	-149.6	0.21375	nominal	0	0	1	1	1	0	0	0	15	NP1
2020/04/25	2:09	JG6YLG	JP	MNG	2	18	0	1	1	1	1	1	0	0	1	-6.05469	-	-	JP2
2020/04/25	3:22	JG6YLF	NP	MNG	1	4.19719	-149.6	0.59531	nominal	0	0	1	0	1	0	0	0	17	NP1
2020/04/25	3:51	JG6YLG	JP	MNG	2	16	0	1	1	1	1	1	0	0	1	-0.19531	-	-	JP2
2020/04/26	2:25	JG6YLF	NP	MNG	1	0	6129.79	75	nominal	0	0	1	0	0	0	0	0	16	NP1
2020/04/26	2:30	JG6YLF	NP	MNG	1	4.19719	-53.7316	0.21375	nominal	0	0	0	1	0	1	0	0	16	NP1
2020/04/26	2:51	JG6YLG	JP	MNG	2	17	0	1	1	1	1	1	0	0	1	-26.5625	-	-	JP2
2020/04/27	1:32	JG6YLF	NP	MNG	1	4.19719	-149.6	0.21375	nominal	0	0	1	0	1	0	0	0	15	NP1
2020/04/27	1:57	JG6YLG	JP	MNG	1	4.17175	-245.469	0.59531	nominal	0	0	1	0	1	0	0	0	15	JP1
2020/04/27	3:10	JG6YLF	NP	MNG	1	4.19719	-53.7316	-0.16781	nominal	0	0	1	0	0	1	0	0	16	NP1
2020/04/28	2:12	JG6YLF	NP	MNG	1	4.19719	-101.666	0.59531	nominal	0	0	1	0	0	1	0	0	15	NP1
2020/04/28	2:37	JG6YLG	JP	MNG	1	4.17175	-53.7316	0.97688	nominal	0	0	1	0	0	1	0	0	16	JP1
2020/04/29	1:18	JG6YLF	NP	MNG	2	-10	1	3	1	1	1	0	0	0	1	-16.7969	-	-	NP2
2020/04/29	1:43	JG6YLG	JP	MNG	1	4.09544	-149.6	-0.54937	nominal	0	0	1	0	1	0	0	0	15	JP1
2020/05/01	1:11	JG6YLF	NP	MNG	1	4.19719	-101.666	0.59531	nominal	0	0	1	0	0	1	0	0	14	NP1
2020/05/01	1:36	JG6YLG	JP	MNG	1	4.19719	-53.7316	0.59531	nominal	0	0	1	0	1	1	0	0	15	JP1

BIRDS3: Satellite operation report from Mongolia

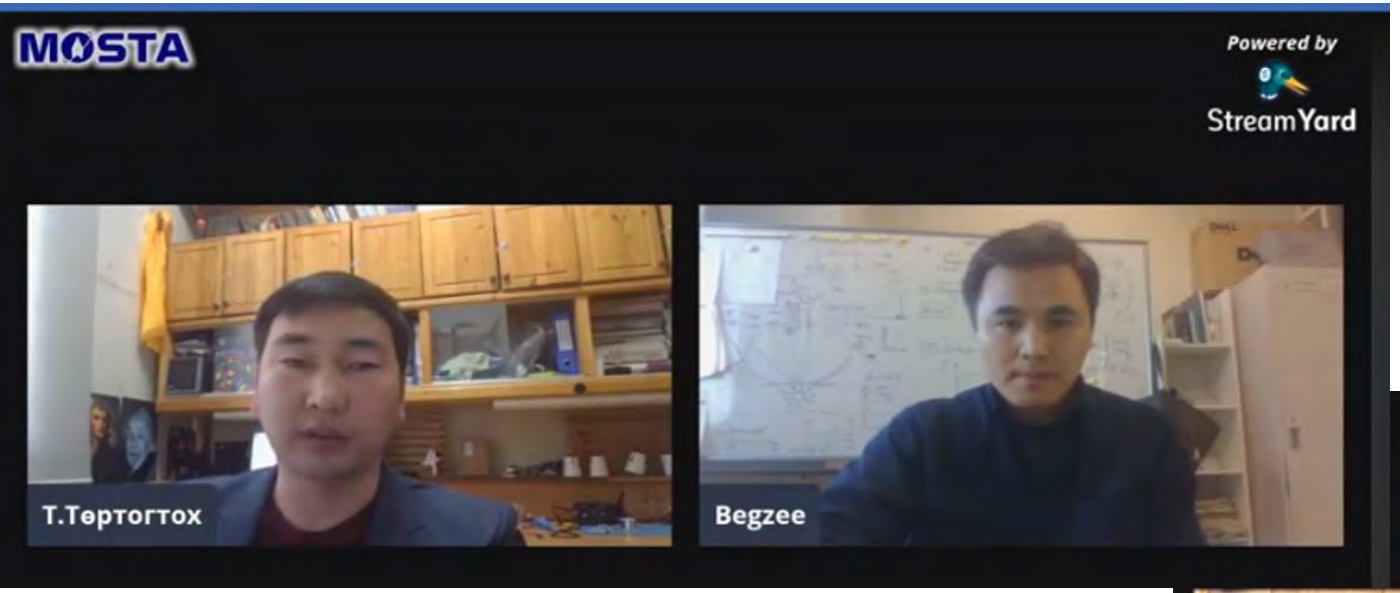
Mongolian GS received the front-line workers who are fighting against COVID19 pandemic in Mongolia.
We would like to thank the **BIRDS 3 Project** team for broadcasting our request using **CW-SMS service.**



Dr. Nyamkhuu D. (National Center for Communicable Diseases)
Dr. Chinbayar Ts. (National Center for Communicable Diseases)

MoSTA activities:

MOSTA has started to host the discussion with researchers and scientist who are living abroad from Mongolia about space technology.



Guest Speaker №1 Dr. **Begzsuren Tumendemberel**
(Researcher, Hokkaido University)
Topic: Optical property of leaves and study of spectro-polarimetric leaf BRDF

https://www.facebook.com/Mongolian.Space.Technology/videos/291076215232797/

Guest Speaker №2 Dr. **B.Bayarbadrakh**
(Glenn Research Center, NASA)
Topic: Space Technology, Future trends, and Deep Space Missions

https://www.facebook.com/watch/?v=254205592554586

COVID 19 Situation in Mongolia

Mongolia registered its first case of COVID-19 on 9 March 2020. As of 12 June, a total of 197 cases registered. All cases were imported by foreigners with residence permission in Mongolia and Mongolians who are coming back home.

Heightened state of readiness extended until June 30

- **18 charter flights, rail services arranged to bring over 9,500 Mongolians home (as of 12 June)**
- **Public activities including the school and university programs cancelled until 1 September 2020.**

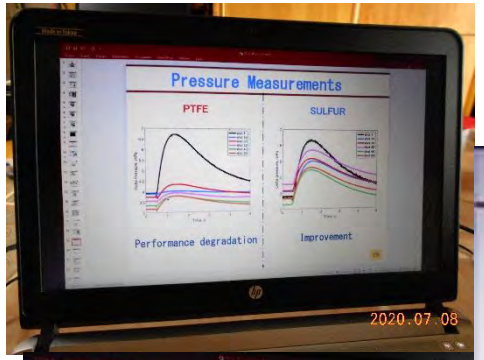
Disinfection is being carried out on public roads and squares

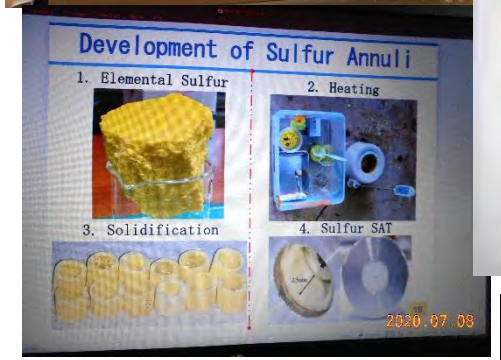
END OF REPORT FROM MONGOLIA

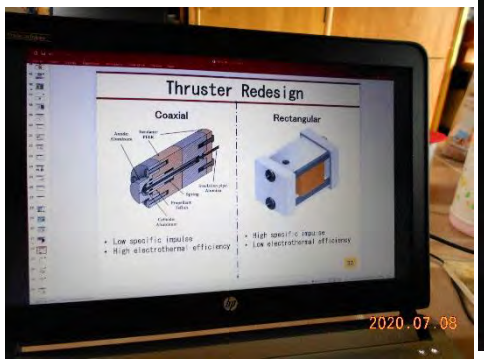
07. LaSEINE Weekly Research Seminar of 8 July 2020

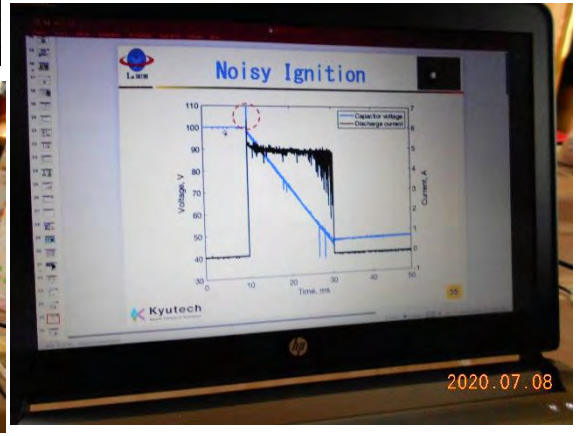
A long-time tradition of **LaSEINE Laboratory** is the weekly research seminar. Once a week the entire lab gathers in the 4th floor seminar room. However, during the pandemic we are doing this seminar via ZOOM.

Senior (Namibia)

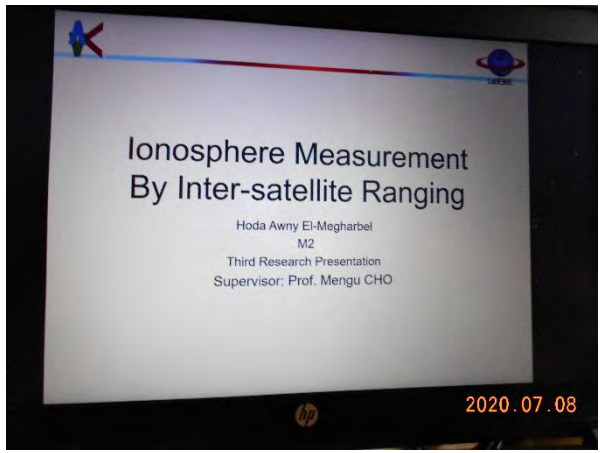


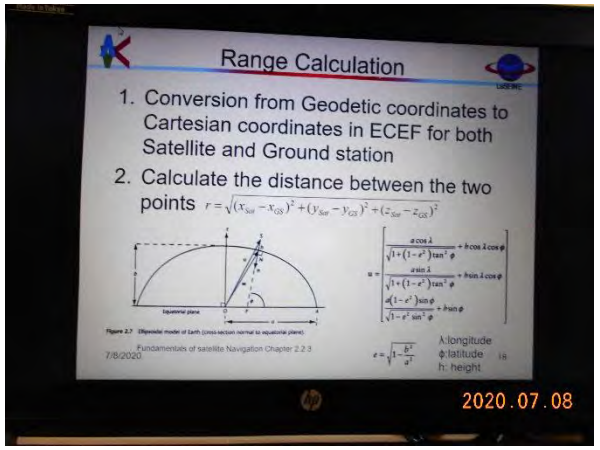




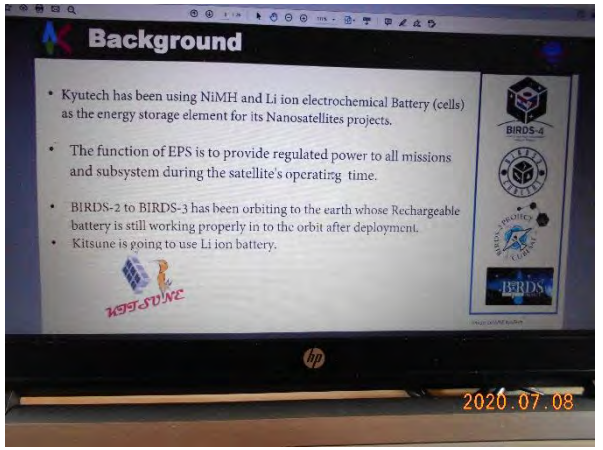


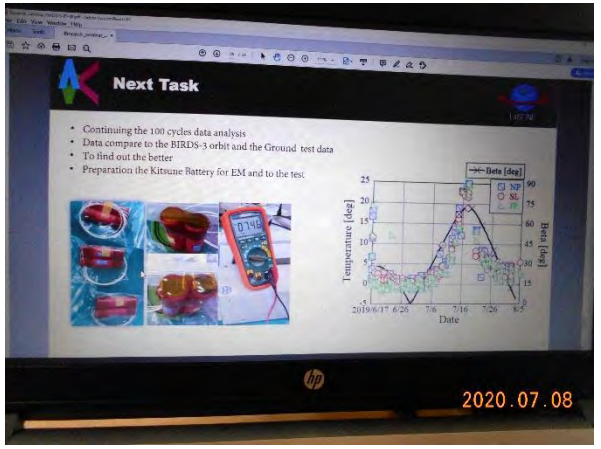
Hoda (Egypt)





Hari (Nepal)





05. BIRDS-3 has a monthly pot luck dinner party – scenes of 24 Feb. 2018

Venue: Lobby of the Int'l Dorm

Manjula, guest from Sri Lanka (working on his Phd there and came to Kyu Dai for 2 weeks)

BIRDS PROJECT NEWSLETTER
No. 26, page 16 of 97

08. Report from Sri Lanka (space weather observatory)

The following report (the next two pages) was written by:

2020.07.08

Manjula Ranasinghe
Researcher,
Astronomy and Space Science Unit,
Department of Physics,
University of Colombo, Sri Lanka

← He attended a ***BIRDS-3 Pot Luck Dinner*** on 24 Feb. 2018, as shown on page 16 of Issue No. 26 of the BPN.

MAGDAS station in Sri Lanka

Sri Lanka is a very important place to study geomagnetic variations around geomagnetic dip equator because geomagnetic dip equator is crossing across the land. MAGDAS is a global network of ground-based magnetometers in different locations of the world which is maintained by International Center for Space Weather Science and Education (ICSWSE), Kyushu University, Japan. As a data gathering point for MAGDAS project, a MAGDAS-9 magnetometer has been installed in Sri Lanka around Dompe area in February, 2016. These measuring data can be used in research domains like space weather/science, geophysical studies, environmental science and atmospheric physics.

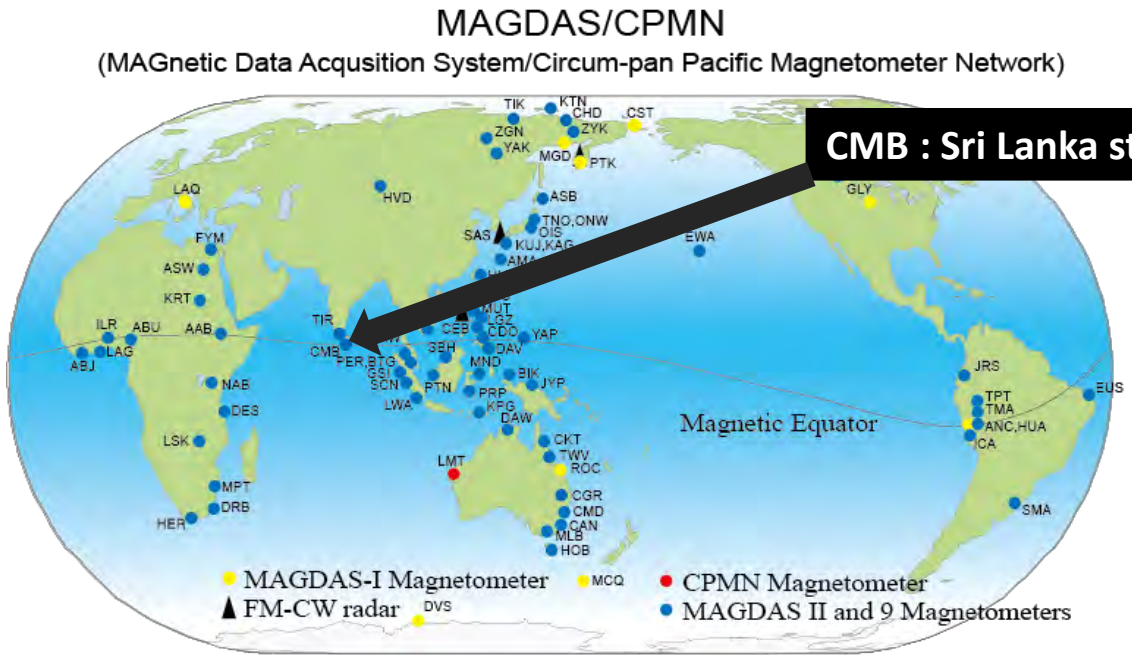


Figure 1 : Location of Sri Lanka MAGDAS station in MAGDAS world map

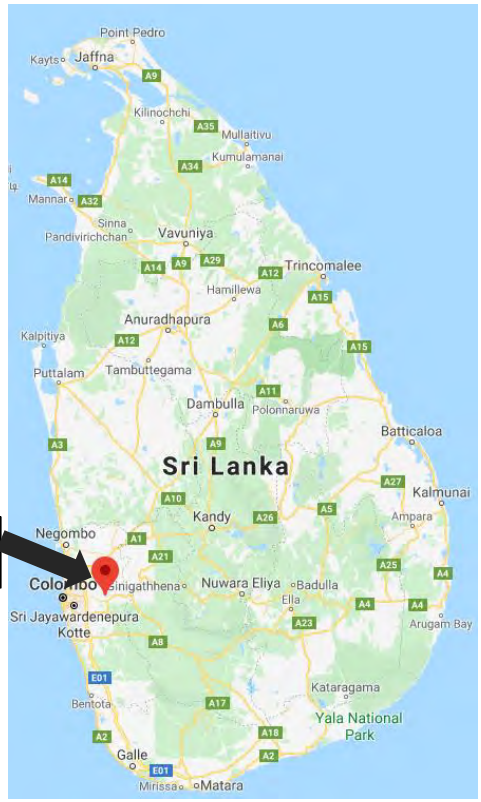


Figure 2 : Location of MAGDAS station in Sri Lanka

Dompe area, (6.97°N, 80.07°E)

Latitude from geomagnetic dip equator is -0.34°

Prof. Yoshikawa, Prof. Jayaratne and the team setting up the senor.

Magnetometer sensor.

Pre-amp to improve the signals from the sensor.

Display of the data logger connected to sensor via the pre-amp.

I would like to thank BIRDS-3 team for giving me opportunity to write an article in the BIRDS Project Newsletter and specially I would like to thank to BIRDS-3 team for arranging a site visit to BIRDS-3 premises in February 2018. Also I would like to thank Sri Lanka NRC for giving financial assistance for the project under Research Grant 16-098.

Manjula Ranasinghe
Researcher
Astronomy and Space Science Unit
Department of Physics, University of Colombo, Sri Lanka

END OF REPORT FROM SRI LANKA REGARDING SPACE WEATHER OBSERVATORY

Continuous CW-SMS service by BIRDS-3

Hari Ram SHRESTHA
Nepal, BIRDS-3
11 July, 2020

BIRDS-3: CW-SMSing service – Worldwide public service initiative

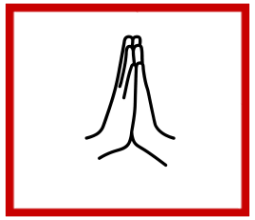
Country	6 letter message
Malaysia	TQMYFL
Malaysia	DRSHAM
Bhutan	HMJKNW
Bhutan	MOHBHU
Malaysia	SIRYAM
Sri Lanka	SLMEDI
Sudan	Samo7o
saudi arabia	fadia
Bhutan	DESUUP
Western Australia	Rindup
Bhutan	MOHbhu
Bhutan	SDorji
Bhutan	Doctor
Bhutan	Thanks
Bhutan	RGOB
Bhutan	SonamY
UAE	caloy
Bangladesh	SNJUTI
Bangladesh	SAMIR
Bhutan	DorDuk
Nepal	Jenny
Nepal	TIKA
Nepal	Pratik
Bhutan	MOHbhu
Bhutan	Kinga
Bhutan	BHUFOR
Sri Lanka	DRANIL
Sri Lanka	SSILVA
Nepal	Asmita

Country	6 letter message
Nepal	Sedhai
Nepal	Garima
Nepal	Kabita
Nepal	Srikki
Sri Lanka	Hasini
Sri Lanka	DRHPW
Japan	PETERC
Philippines	Reysan
Philippines	PeterJ
Uganda	R Acen
Philippines	HANNAH
Sudan	DRAYA
Nepal	RcDASO
Nepal	Amisha
Nepal	Rabina
Nepal	Bijeta
Nepal	Sabina
Nepal	Pasang
Nepal	Sabita
Nepal	Asmita
Nepal	JKS
Nepal	BHARAT
Nepal	NurseX
Paraguay	DiegoS
Nepal	P.Sah
Nepal	Amrit
Nepal	Prbhav
Bangladesh	IEDCR
Bangladesh	BRAC
Nepal	Needa
Nepal	Cil
Sri Lanka	Hasini
Malaysia	TQMYFL
Malaysia	DRSHAM

Until now requested: **140**
Broadcasted : **125**
Previous article: written by Pooja; Click here

From KyuTech Ground station, BIRDS-3 team has been doing this service, especially appreciate the persons and workers who have been working as a frontline selflessly taking personal risks so that we can stay safe. Satellites are broadcasting 6 characters of their name and we get it as a short message in CW Morse code Language.

Again BIRDS-3 team would like to thank the front-line workers who have been working during this pandemic time.

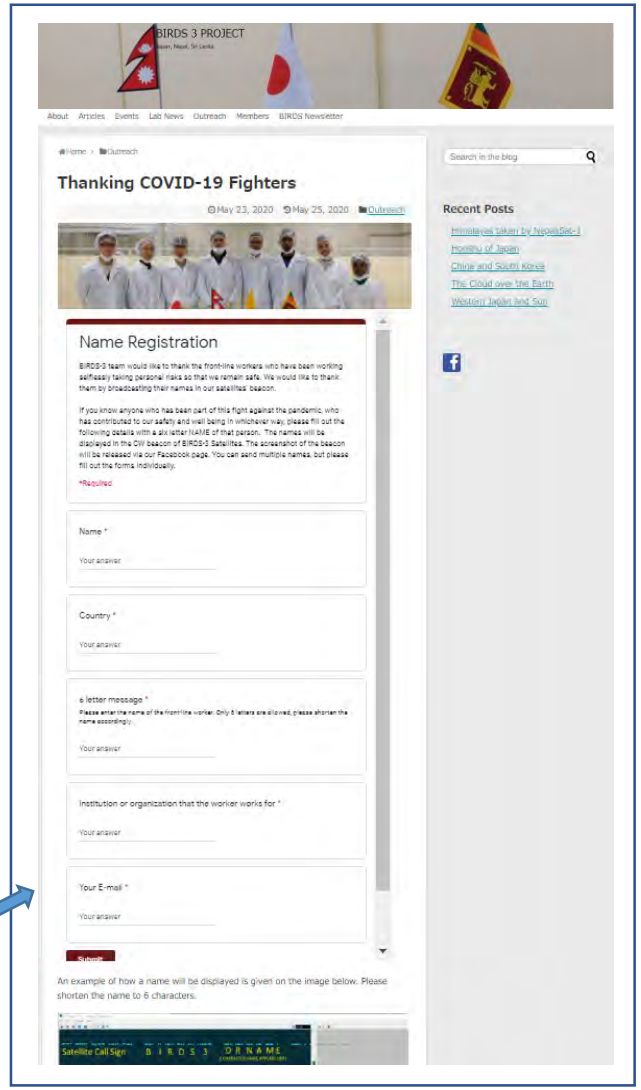


NAMASTE

If you want to give your appreciation, acknowledge to them, who has been working hard to ensure the hospital, service sector, supply chain maker and who is making a people's life easier in this pandemic time.

You can click in the below link and to register the information then we will broadcast from BIRDS-3 Satellite.

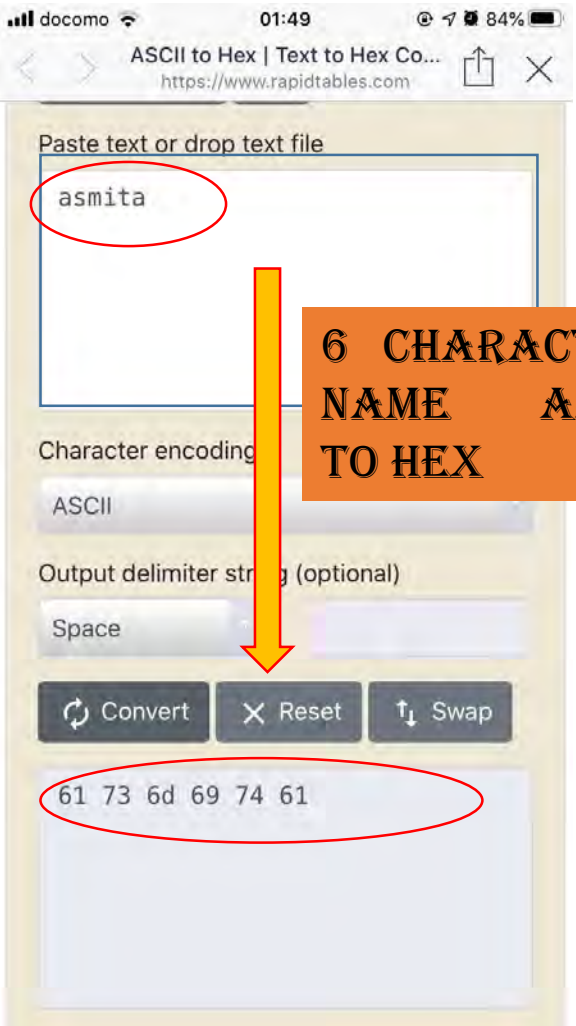
https://birds3.birds-project.com/2020/05/23/thanking-covid-19-fighters/



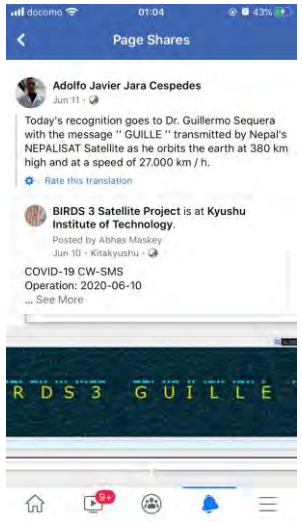
This is an update of previous article in BIRDS Project Newsletter – No.53; Page 142 to 147

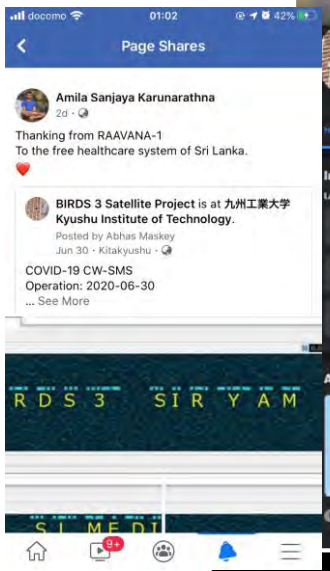
Social Media: BIRDS3 Satellite Project

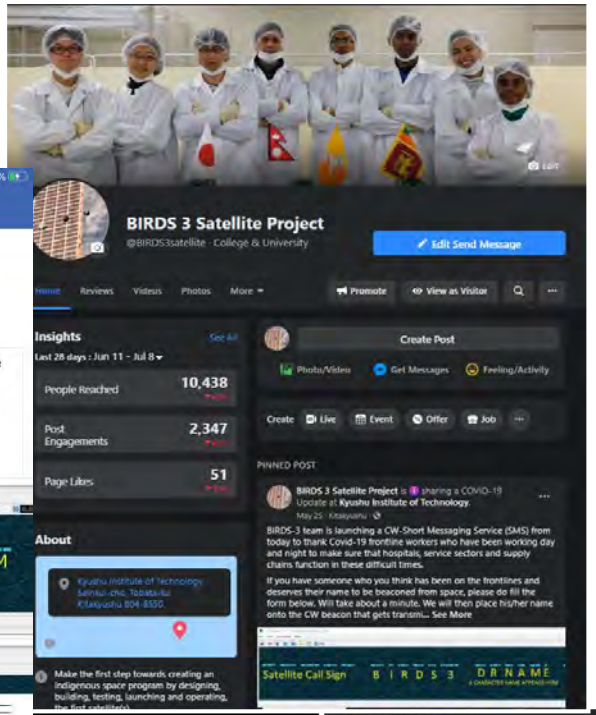
Written By: Hari Ram Shrestha



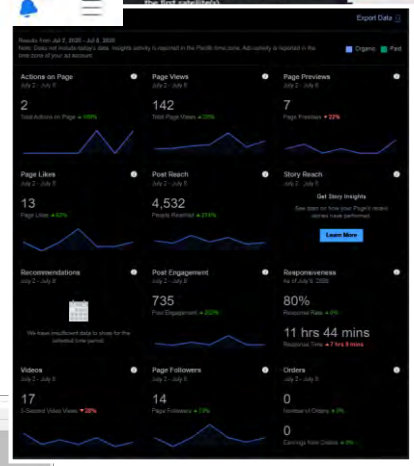
6 CHARACTER NAME ASCII TO HEX



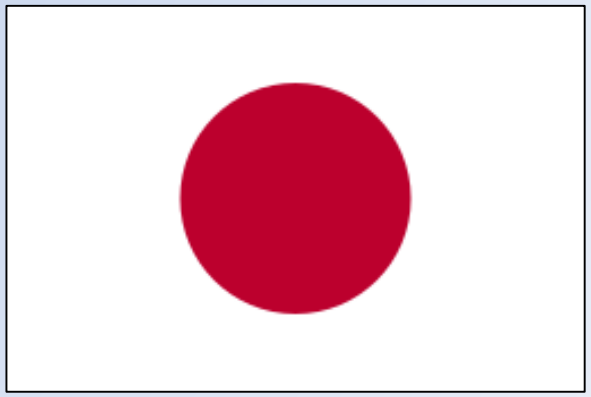




BIRDS-3 also has been receiving positive reviews and gratitude messages from the peoples for this novel CW-SMS initiative.



BIRDS 5 Project Progress Update

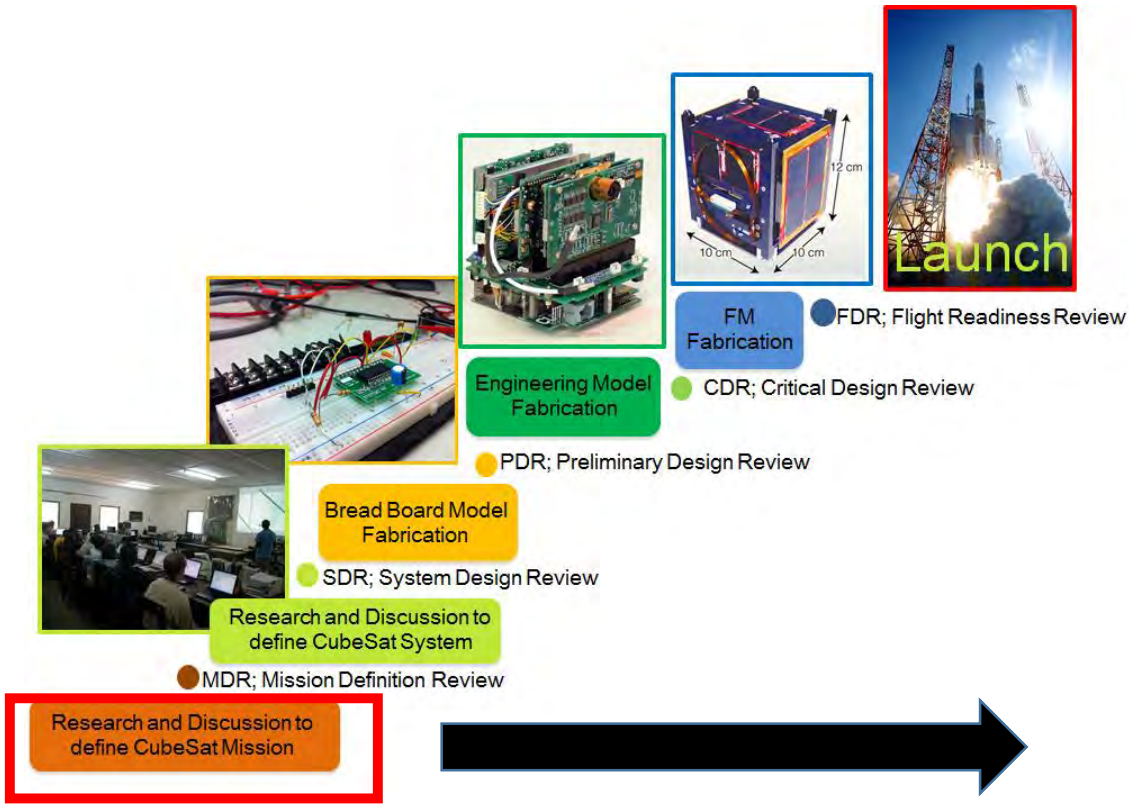




Authors:

- **Victor Mukungunugwa**
- **Ramson Munyaradzi Nyamukondiwa**
- **Timothy Kudzanayi Kuhamba**

12 July 2020

Missions Progress Update

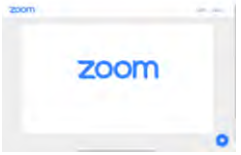


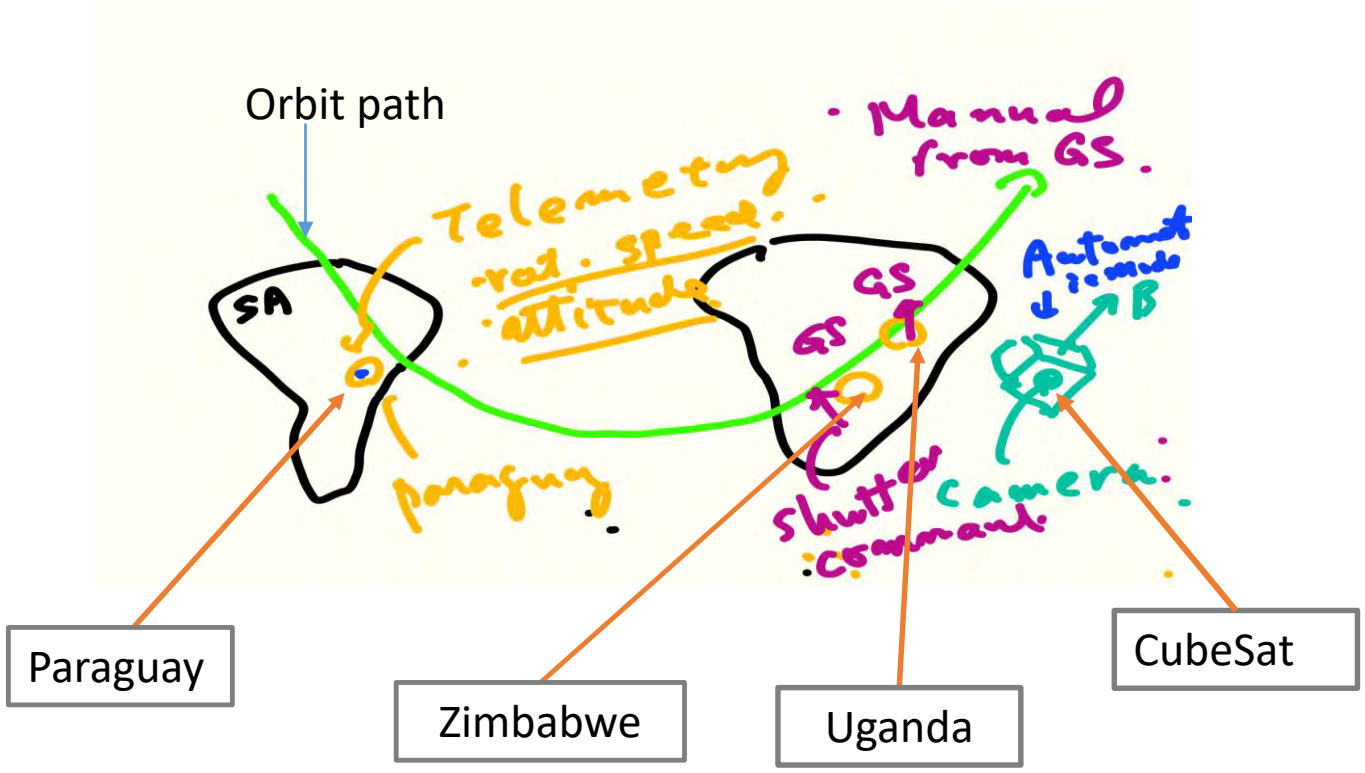
Missions Under Review

N	Topic	Status
1.	**Land Cover and Use**	**Under Consideration**
2.	**Water Quality**	**Under Consideration**
3.	**Solar mapping**	**Under Consideration**
4.	Precision Agriculture (Soil Moisture)	Dropped
5.	Border Control	Dropped
6.	Disease and Vector Control (Covid-19, Cholera, Malaria, Ebola, Ticks, Foot and Mouth)	Dropped
7.	Mineral and Natural Resources (Mines, Forest and Wetlands)	Dropped
8.	Disaster Management (Floods, Cyclone, Fire and Mud/Land Slides)	Dropped

Meetings

- Meeting are held every week via zoom with the team from Zimbabwe and Uganda presentation on the assigned tasks
- Cho sensei giving guidance to Birds 5 student online



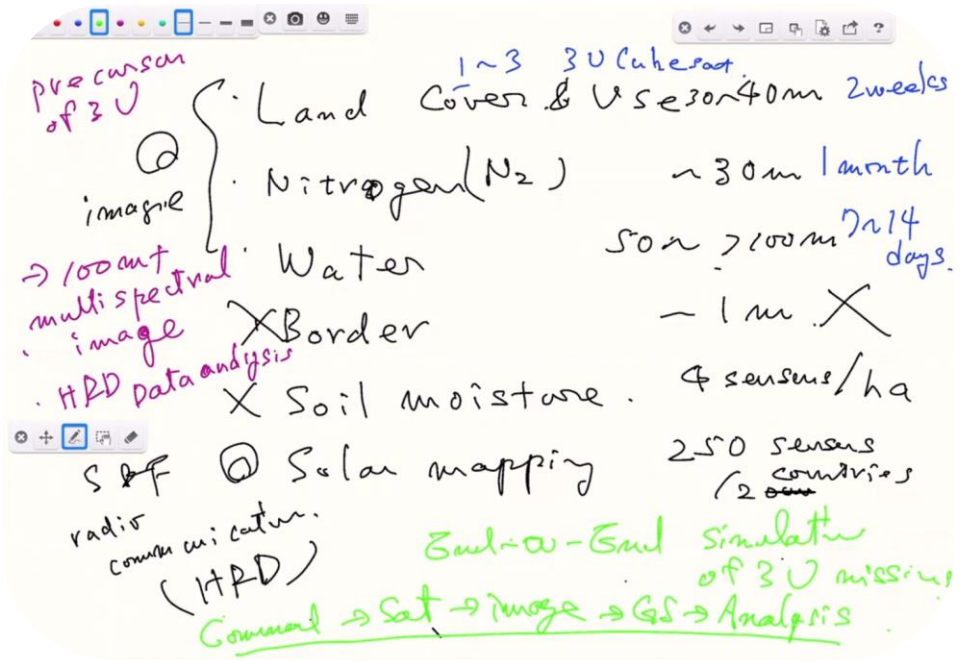


Cho sensei calculating time taken to download satellite images on Zoom meeting

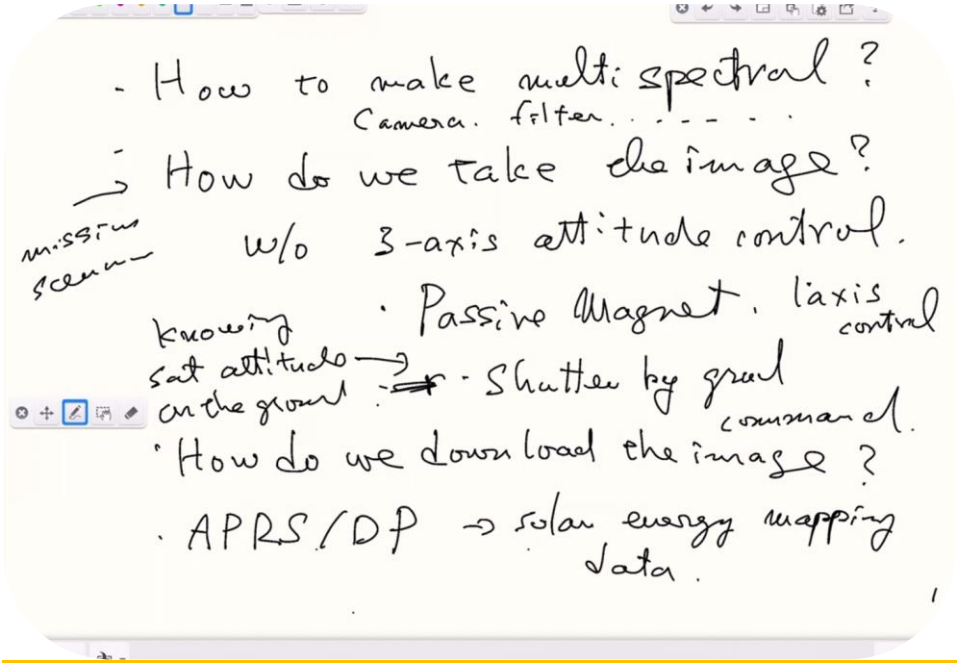
From PROFESSOR MENGU CHO to Everyone: (5:40 PM)

- ❑ 4800bps
- ❑ Effective downlink 2400bps
- ❑ 100kB data
- ❑ 100kB -> 800kbit
- ❑ 800kbit/2.4kbps= 300 seconds
- ❑ 1 pass = 5 mins =300 seconds
- ❑ 100kB data / day
- ❑ 1 week to downlink
- ❑ 700kB / week
- ❑ Image compression

Cho Sensei Detailing the BIRDS-5 Proposed Missions and their Feasibility



Boarder security and soil moisture dropped due to limitations of 1U Cubesat and also cost



Birds 5 student receiving research areas from Cho sensei

Common Needs for Zimbabwe and Uganda

S/N	Topic	Spatial Resolution	Temporal Resolution
1.	Land Cover and Use	30-40m	2 weeks
2.	Soil fertility, Nitrogen (N_2)	30m	1 month
3.	Water quality	50-100m	7-14 days
4.	Solar mapping	Which requires 250 sensors for the two countries.	

Research area	Country tasked	Comments	Presenters
Making a multispectral camera	Zimbabwe	❖ How to do multispectral focusing on the cameras and filters that achieves a spatial resolution of 100m and spectral resolution 400-900nm. ❖ Selected bands =< 3	❖ Ramson M Nyamukondiwa ❖ Victor Mukungunugwa
Satellite Attitude determination and control	Zimbabwe	❖ Determining attitude by passive method ❖ Magnetic stabilization ❖ Torque	❖ Timothy Kuhamba
Downloading Images	Uganda	❖ How To Download Satellite Images ❖ Remote Sensing ❖ Satellite Image Processing	❖ Derrick Tebusweke
Automatic Packet reporting system	Uganda	❖ APRS Station Types ❖ APRS Station Equipment Requirements ❖ Data Transmission	❖ Bonny Omara ❖ Edgar Mujuni

Evaluation of Technical Operations

How to Do Multispectral?

Arducam 1.3MP MT9M001 Infrared HD CMOS Camera Module with Adapter Board (Rev 1.0, Nov. 2013)

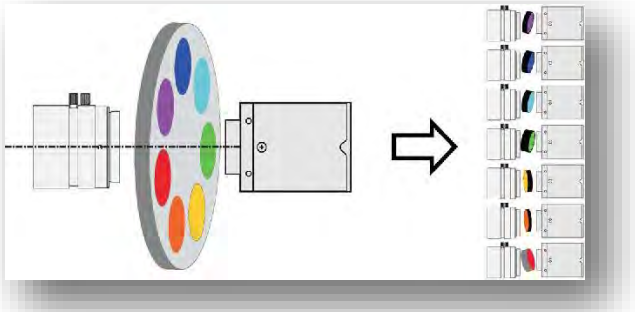
Camera

https://www.arducam.com/product/arducam-cmos-mt9n001-1-2-3-inch-9mp-color-camera-module/

Filters

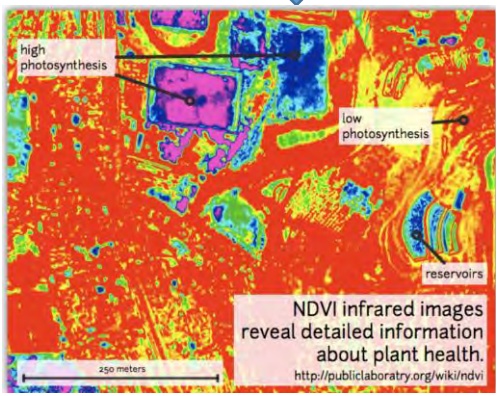
https://www.edmundoptics.jp/f/high-performance-od-4-shortpass-filters/13534/

Multispectral



https://www.semanticscholar.org/paper/Geometric-Calibration-of-Lens-and-Filter-for-Brauers-Aach/06fb70aa541b0cdff4765b3ddb75c7b9461dfe0b/figure/2

Image Taken



Camera Evaluations in Progress is based on:

- Camera pixel size
- Number of pixels
- Field of view
- Spatial resolution

Note:

- Diameter of your filter = The diameter of your optics.
- Filters: Screw on, Drop in, Square, and rectangular

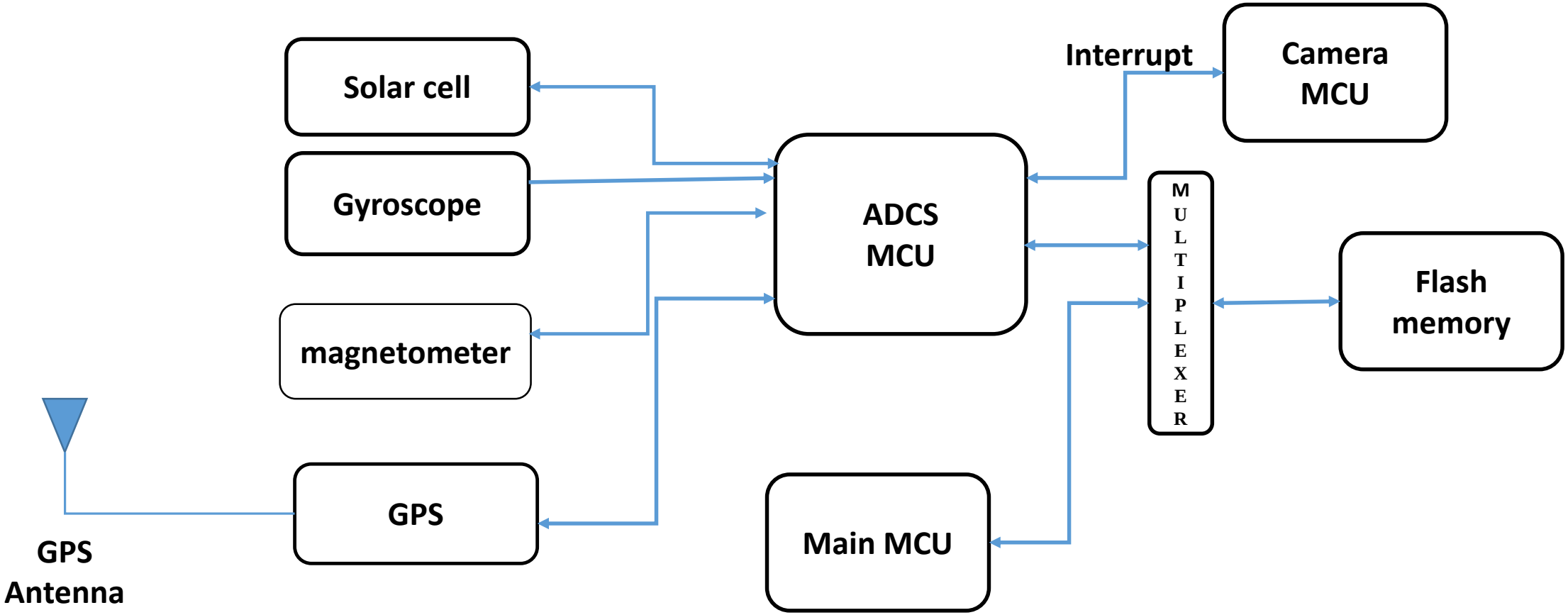
Please check on https://www.edmundoptics.jp/

E.g. Application

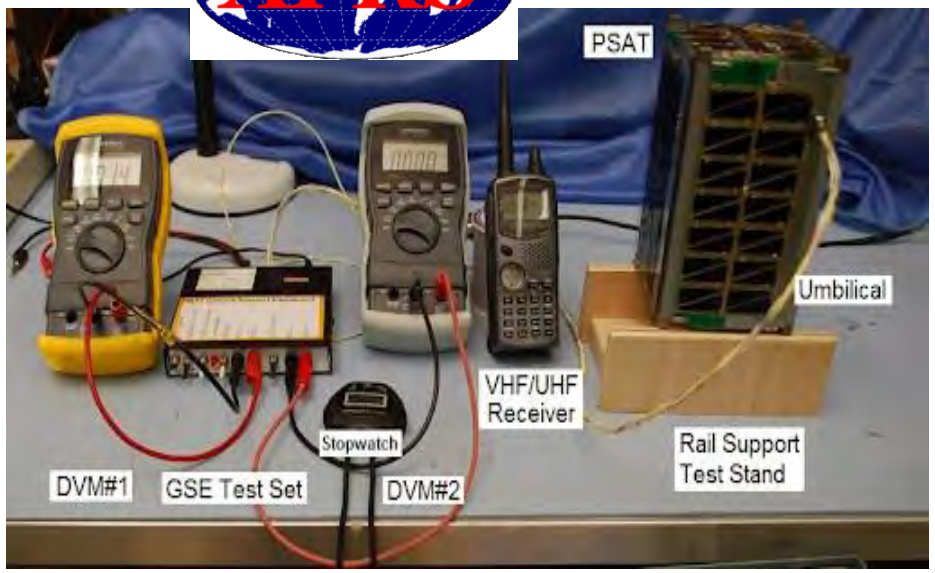
- Land Use and Land Cover

How to Take Images using Passive Method ?

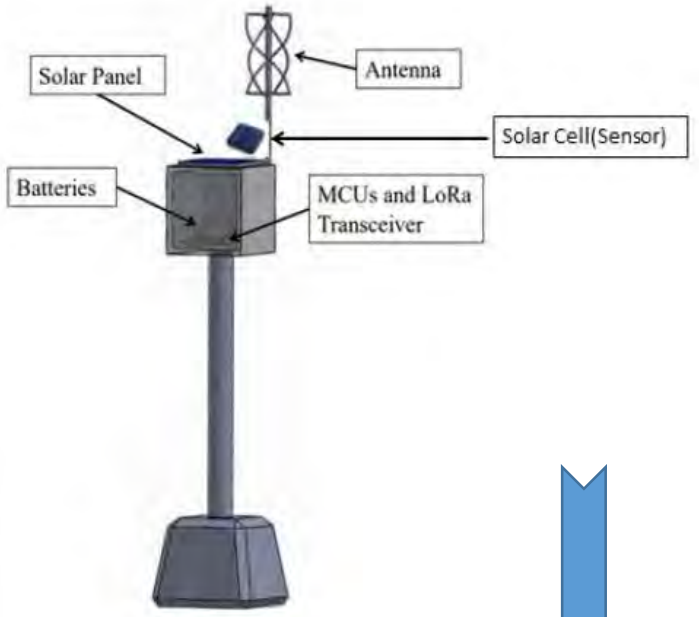
- After it is determined that the camera is facing Earth, ADCS will give an interrupt to camera subsystem for taking pictures.

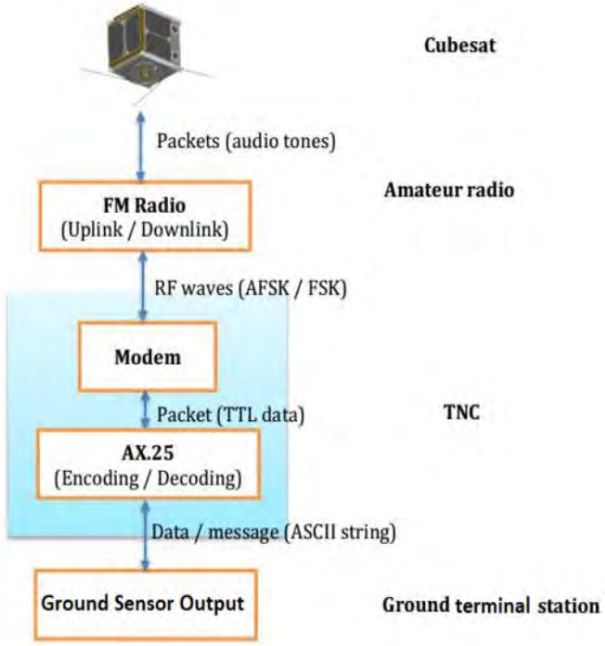


APRS for Solar Mapping



APRS Ground Sensor Terminal Structure





APRS data Formats

```
16:50:52RNOCALL>APTT4,WIDE1-1Port=2
<UI Len=34>:
T#021,065,999,794,311,999,00000011.
```

Data Formats	Explanations
16:50:52R	Western Indonesian times
NOCALL	Callsign and SSID
APTT4	APRS Tracker Firmware
WIDE1-1	APRS Path
Port=2	Port AGWPE
<UI Len=34>	Numbers of transmitted characters
T#021,065,999, 794,311,999, 00000011	Telemetry data received

OSI Network Model as applied to APRS Network Structure

OSI Reference Model	
APRS Messaging	Transport
APRS	Network
AX.25	Data Link
VHF FM	Physical

How to Download Images ?

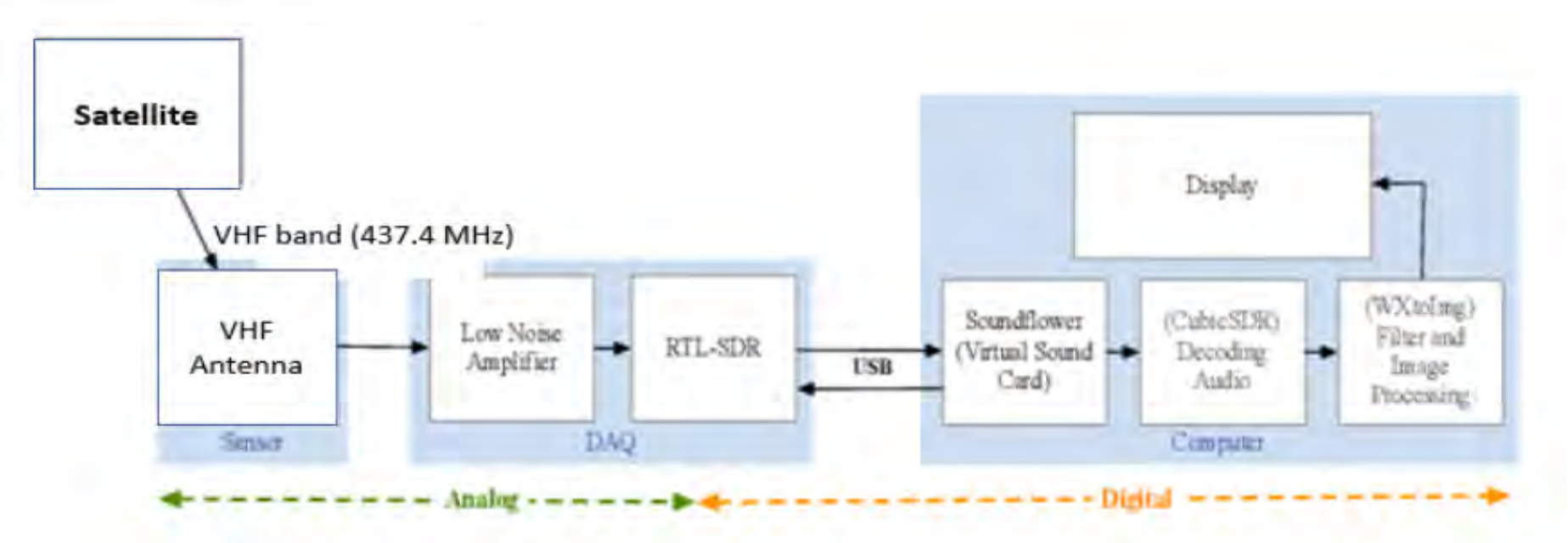


Diagram gives an outline of how the processes goes. However it's still under study.

Some BIRDS-5 Team Members have sketched out some logo ideas

These designs are strictly preliminary. Ideas will also be submitted by four Japanese students, Fahd (Morocco), and Keenan (Trinidad). Final design will be out by early August 2020.

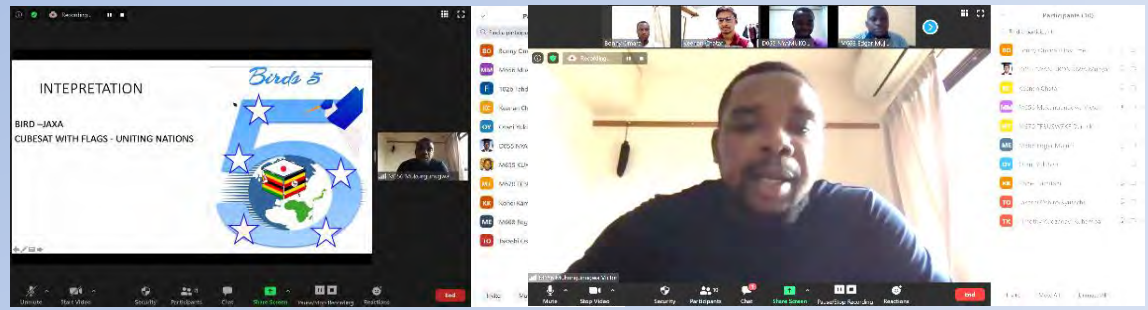
END OF THIS SECTION

11. BIRDS-5: Progress on designing the project logo

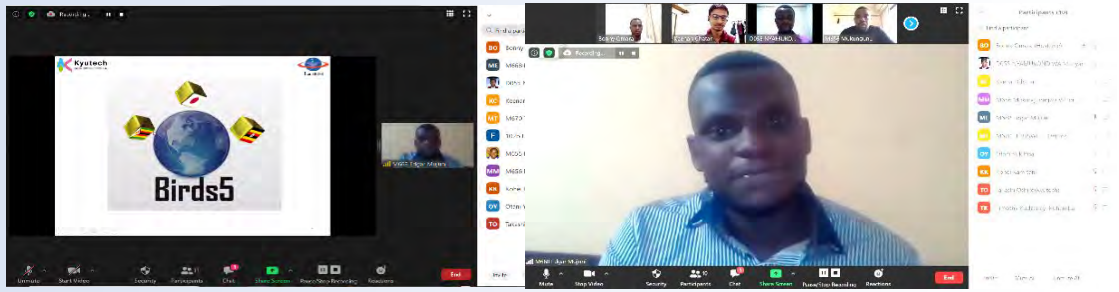
BIRDS-5 team has been conducting online meetings to establish the BIRDS-5 project logo; the effort is organized by Bonny. The photos in this section all came from him.

CONTINUED ON THE NEXT PAGE

Victor



Edgar



Keenan

Oshiro

Timothy

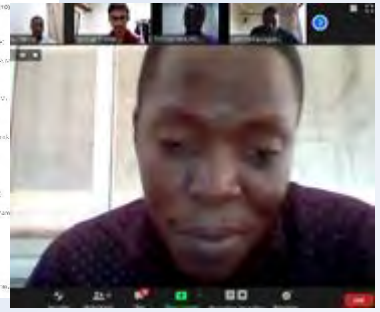
Kohei

Otani

Bonny

Ramson

Derrick



On 3 July, the Zimbabwe team and others helped Femi (Nigeria) celebrate his birthday. Age was not disclosed.

Post-Kyutech Update From Cal Poly

Bobby Reid

California Polytechnic State University

Aerospace Engineering Graduate Student

July 10, 2020

お元気ですか？

みんな久しぶり！ **Hello everyone, this is Bobby from Cal Poly. Nearly a year has passed since I left Kyutech last summer, and when I reflect on that I find myself becoming increasingly nostalgic for the memories that I made with all of you during my stay. I had actually been planning to return to visit this summer to celebrate the completion of my undergraduate studies, but certain, obvious circumstances have cancelled those plans (for now, at least). Nevertheless, it has certainly been an eventful year for me since I departed Japan last August, and I am curious to know how you have all been during that period, as well. I saw that several of you have graduated and moved onto the next chapter of your lives and to those members I offer my sincerest congratulations. I still keep in contact with many of you, but for those who I haven't spoken to in awhile I hope that you are all doing well and I look forward to the next time that we can sit, chat, and celebrate what we've accomplished since we last met. Until then, I hope you all stay healthy and safe and know that I'm praying for your continued success.**

Sincerely, Bobby Reid

What Have I Been Up To?

- I have just completed my senior year of my undergraduate education
  - During this school year, me and my graduating class were assigned our senior design project.
  - This year's assignment was to design a communication and navigation infrastructure for manned lunar missions (Presentations/documentation detailing our design: https://drive.google.com/drive/folders/1hZtYjmAoEkxr6eBVZ676-s06pmriQaI-?usp=sharing).
  - The assignment lasted the entire school year (September-June) and consisted of several trips to various aerospace companies.
  - My class consisted of 63 individuals and I was elected to serve as the Project Director alongside another classmate.
    - My responsibilities consisted of creating success criteria, organizational hierarchy, schedules, work breakdown structures, business models, etc.

COLONEE at NASA AMES following our System Requirements Review

Research, Extracurriculars, and Plans Moving Forward

- Outside of class, I was performing atomic oxygen tests on spacecraft materials for SpaceX at Cal Poly's spacecraft environment laboratory.
- While I have completed my undergraduate education, I will be beginning my graduate studies in September.
  - Cal Poly has a BS+MS program that will allow me to complete my MS in just one year.
  - My thesis will be detailing the degradation of Multi-Layer Insulation in a LEO environment.
  - Currently I'm performing the literature review for my thesis and plan to start testing sometime in December or January
  - I've contemplated pursuing a Ph.D, as well (maybe even at Kyutech)
- I have also been serving as the safety officer for Cal Poly's aerospace department since January
  - I oversee the safe operation of laboratory equipment and ensure that all labs are following proper safety guidelines.

As you can see, I take my safety position very seriously

Random Topics

- I've been trying out various hobbies to pass time during quarantine
  - I started collecting and building mechanical keyboards and have hopes of designing and machining my own in the future.
  - My Japanese is very poor at the moment, but I'm trying to practice a lot this summer.

I have been trying to fish

Prior to my first fishing trip I remembered Toyoda-Sensei's lecture on fishing and engineering from last year's summer camp [photo below] and tried to apply some of his advice (I haven't had much success so far so maybe I need to ask for advice).

2019 LaSEINE Summer Camp

CAL POLY

Until Next Time/またね!

END OF UPDATE FROM CAL POLY

Meet Honduras, heart of Central America

By Reynel Josué Galindo Rosales

8 July 2020

1st year SEIC Student

Project Morazan
National Autonomous University of Honduras

Where is Honduras?

Honduras is located right in the middle of the american continent. It is connected to the Atlantic ocean on the north and the Pacific ocean on the south. Since it is very close to the equator (about 14°), the climate is very stable and the country only has two distinct seasons: dry season and rainy season.
Honduras is a very mountainous country, making its natural resources very diverse.

Honduras is not only beaches and mountains, since it is also a territory full of parks and natural reserves that are home to many species. The green beauty of these ecosystems show a different side of the country.
Throughout the year, various fairs are held in the country in every department, where people sing, dance and use our traditional costumes to perform different cultural shows.

All resources used in this presentation come from:

[Honduras Tips]

In Honduras, the main language is Spanish, and only about 6% of the population can speak English.
It is divided in 18 regions called departments, and each of them has a very distinct cultural background, gastronomy and geographical diversity.

Places to Visit in Honduras - North and West

Tela

The beaches of Tela are very accessible. Some are surrounded by lush trees and many coconut palms. Visiting here is one of the most refreshing experiences you can do. Its mix of crystal clear and turquoise water is very calming. You can find white faced monkeys and false jellyfish.

Macaw Mountain Park

Macaw mountains, shelters around 300 species of native wild birds, including Honduras National Bird, the Ara Macaw (or scarlet macaw). The tourist who come to this establishment will be able to have direct contact with these birds, and thus take their best souvenir photographs with them.

Roatán

The Mesoamerican Reef System extends more than 1,000 km, and it includes Roatán. The colorful and exotic marine life and unspoiled diving spots provided by the reef make Roatán a paradise for scuba diving, snorkeling, beach lovers, and scientific experts from all over the world.

Copán Ruinas

Copán ruinas is the most important cultural destination in Honduras. Throughout the year, travelers come to discover the great secrets of the Mayan culture and the diverse natural attractions that the famous city has. This magical city is located in the mountainous west side of Honduras.

Places to visit in Honduras - South, Center and East

Amapala

Amapala is a true paradise that belongs to the Gulf of Fonseca, in the south. This place rests at the foot of the largest inactive volcano in Honduras. For this reason, it is a destination surrounded by abundant vegetation of flora, fauna and amazing beaches with volcanic sand. Sunsets are an spectacle to experience here.

Talgua Caves

Located in Olancho, this cave has stalactite and stalagmite formations, natural structures that are produced by the loss of acidic water that dissolves the limestone rock. The Talgua caves are 500 m long. It is an unforgettable experience because each step can take you to a world that is as fascinating as it is incomprensible.

Comayagua

Comayagua is one of the best-known historical centers of Honduras, currently maintaining its old buildings with architectural value from the colonial era.
Its historic center has been restored and preserved, as it is an ancient jewel that attracts thousands of local and international tourists.

Celaque

The Celaque Mountain National Park is located in the department of Lempira. It is the highest point in the country, with 2849 meters above sea level and an endless number of ups and downs. The experience is described as being outside a plane, where you can see a sunrise of spectacular chromatic colors filtering through the clouds.

What do we eat in Honduras?

Tapado Soup
This soup has a mixture of different meats, but mainly beef. The soup itself is very dense, as it is condimented using coconut milk and mashed yuca.

Nacatamal
This dish is eaten a lot in christmas. It is made of corn based dough, which is steamed inside a banana leaf. They can be filled with meats, vegetables and grains.

Baleadas
The staple of the country. A wheat flour tortilla, filled with fried beans and traditional cheese. The "Baleada con todo" includes eggs, avocado, meat, and more.

Since Honduras has a lot of differences between geographical regions, food is very varied. However, you may be able to find any of these meals anywhere in Honduras. These are very traditional and every Honduran has eaten one of these at one point in their lives. The fact that all of these meals are available in any place in Honduras attests for their delicious flavor and how they are ingrained in our culture.

Torrejas
A dessert eaten in every christmas. This dish is made with yolk based bread, soaked in condensed and whole milk, or "rapadura" candy. It is very sweet.

Rosquillas
A cookie like dish made from corn based flour and cheese. "Tostacas" are a version which includes "rapadura" candy on the middle (shown on the right).

Marine Soup
A soup which includes lots of different seafood, such as snail, shrimp, crab, lobster, and more!
The bests versions of this soup are found near Honduras beaches.

END OF REPORT FROM HONDURAS

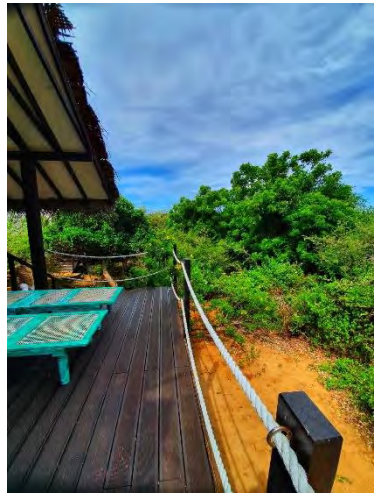
Places to Stay in Sri Lanka

by Dulani Chamika
(BIRDS-3, Sri Lanka)
13 July 2020

Jetwing Yala

Jetwing Yala is a hotel by Jetwing located near the Yala National Park. This place is covered with the jungle and also very close to the sea. From my experience here, I really do recommend this place for nature lovers. You can easily go on a safari in Yala if you stay in this place. This picture shows the main building.

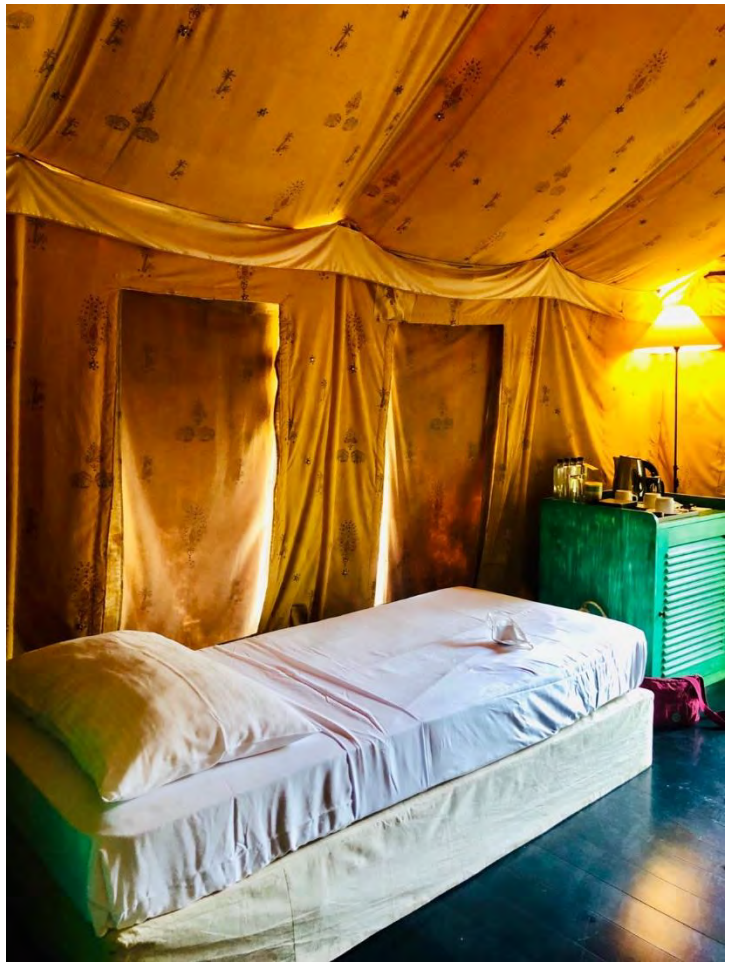
Jetwing Safari Camp



These are jungle tents. This place also runs by Jetwing. I really recommend this place for adventurous people. The first picture shows the front view of the jungle tent we stayed. This is surrounded by jungle and also the sea is visible from here. Elephants come near the tents. If you really want to experience a night with wild animals, this is one of the best places.

Entrance to the jungle tent where we stayed

Jetwing Safari Camp



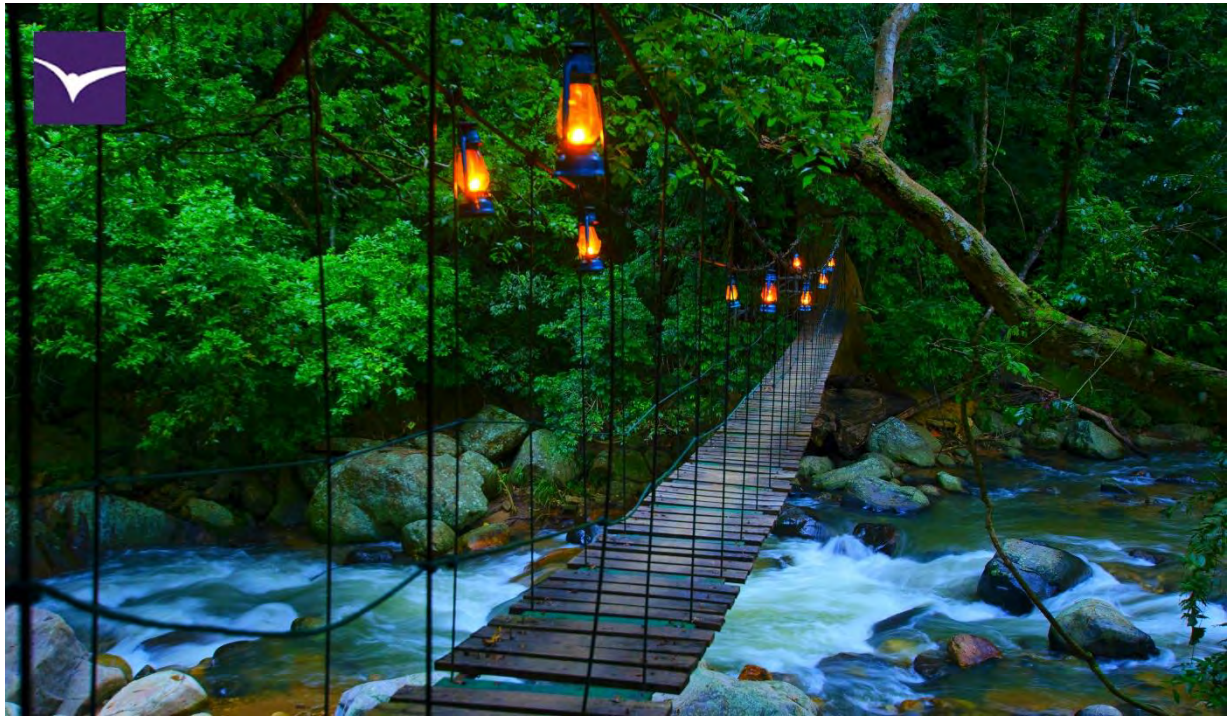
The first picture shows the inside of the tent. The second picture shows the beach swing. I loved riding this swing. You can enjoy the beach, jungle both at once. I would love to go there again.

Ella Relax Cottage

Sri Lanka has beach and mountains both. If you feel like relaxing in the hill country I really do recommend this place. I have stayed in this place two times. But still I don't get fed of the amazing view this cottage has. All the above pictures shows the view from our room. You can see the Ella rock directly from this place. And also, this place is good for bird watching too. You can easily go t Ella rock and Mini Adam's peak from here.

The rooms have glasses so that you can enjoy the view without any disturbance

Ella Jungle resort



I stayed in this place in 2007. That was such an amazing experience. We can't take our vehicles to this hotel. We have to park it in the car park in the main road. And then they took us to the jungle in a four wheel. And then we had to walk a bit. Then we had to cross this beautiful bridge. This bridge is the entrance to the hotel. We stayed in a jungle cottage which was exposed to the nature (you have no doors or windows). It was just opened. This hotel didn't have electricity. Actually they had no electricity, because they wanted the guests to experience the real experience of staying in a jungle. That night was scary. The sound of the water of the stream flowing, and the sound of the wild animals kept us awake the whole night. These are some of the places you can have a wonderful experience. There are many more.

END OF REPORT
FROM SRI LANKA

15. BIRDS-5: Introduction of each student

BPN = BIRDS Project Newsletter

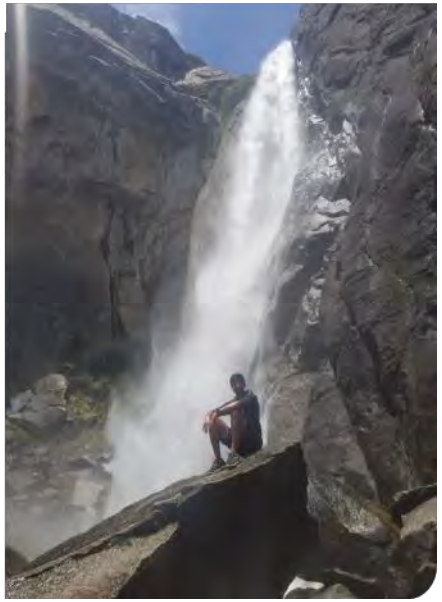
UGANDA	
Bonny Omara	BPN Issue No. 50, pages 31 through 42
Edgar Mujuni	BPN Issue No. 50, pages 31 through 42
Derrick Tebusweke	BPN Issue No. 50, pages 31 through 42
ZIMBABWE	
Timothy Kudzanayi Kuhamba	BPN Issue No. 50, pages 21 through 27
Victor Mukungunugwa	BPN Issue No. 50, pages 21 through 27
Ramson Nyamukondiwa	BPN Issue No. 50, pages 21 through 27
TRINIDAD-TOBAGO	
Keenan Chatar	See the following pages
MOROCCO	
MOUMNI Fahd	See the following pages
JAPAN	
Miori Nakai	See the following pages
Kohei Kamitani	See the following pages
Takashi Oshiro	See the following pages
Yukihisa Otani	See the following pages

Self-introduction

My name is **Keenan Chatar.** I was born on August 14th, 1994. I am from the country of Trinidad and Tobago, which is a small twin-island nation located at the end of the Caribbean archipelago.

I enjoy all outdoor activities such as hiking, surfing, football, badminton and swimming. I also enjoy playing video games and board games such as League of Legends, Catan and chess.

I am interested in space and the wonders it contains. I am also interested in computers and how they can benefit our lives.



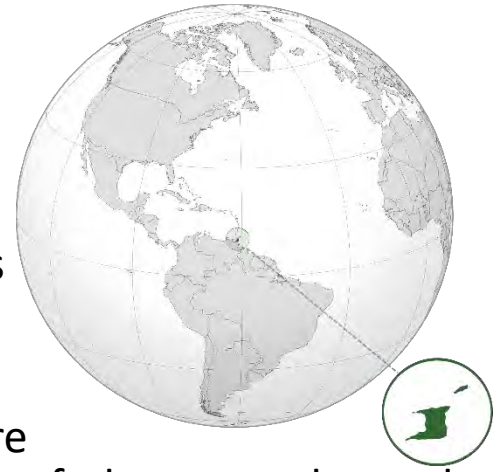
Education and Research Interests

- (Hons.)B.Sc. in Electrical and Computer Engineering (2013 – 2016)
- (Dist.) M.Sc. in Integrated Systems (2016-2019)
- M.Sc. in Space Engineering (2019-present)

I am interested in developing the BIRDS-5 satellite as I always held an interest in the space industry and working on cube satellites is an excellent way to be introduced to the field and gain an understanding about the various considerations for development and research being conducted in this knowledge space. I also enjoy working with groups of like minded individuals who also have a passion for space and engineering.

My Home Country – Trinidad and Tobago

I was born and raised in Trinidad and Tobago which is a twin island republic nation in the Caribbean Sea.



It has some of the most beautiful natural wonders such as reefs, waterfalls, beaches and rainforests. Even though the island is small, there is never a shortage of places to relax and be at peace with nature.

Trinidad and Tobago

My country has a beautiful cultural heritage which is colourful and multifaceted. We celebrate many holidays and festivals such as Carnival, Diwali and Christmas.

Goals

- Work at NASA
- Publish papers in respectable journals
- Earn a Ph.D. in Space Engineering
- Develop my country's first satellite
- Own a Lamborghini

Self-introduction

- I am **MOUMNI Fahd**, 23 years old, from Morocco, the land of the setting sun.
- I can speak Arabic and French (bilingual), English (C1), Spanish (B2), German (B1+), a bit of Japanese (A2), and I have notions of Italian, Portuguese and Swedish. I like languages because they help you acquire a new culture, make friends, travel easily, but most of all, they open your mind!
- I LOVE Sports : I started with Martial arts, but always liked football (or futsal), basketball, athletics (running), scuba-diving, cycling, volleyball, and street-workout. My other hobbies are singing (mostly in a Karaoke or under the shower), dancing, watching anime, travelling (18 countries already), meeting people and learning from them while also sharing my culture.
- I obviously am passionate about SPACE, the “exploration of the unknown” : the unsolved mysteries of space for me are like the riddles that I liked to think about as a teenager.

Me and Pr. DOI, one of the first japanese astronauts !

Playing Futsal in Kyutech

Karaoke with the lab

Italy (San Siro Stadium) and Sweden (Have you ever kissed a Moose ?)

Traditional clothes and flag of my favorite club (Wydad Athletic Club) in Sweden (top). Reaching the summit of one of the mountains in Lofoten Islands, Norway, always with the Moroccan flag (right)

Academic Background and Research

- I come from “Université de Lorraine” more exactly : EEIGM (European School of Engineers in Materials Sciences) in Nancy, France, where I got a Bachelor’s Degree in Engineering Sciences.
- I had a 6-month exchange semester at “Luleå Tekniska Universitet -LTU” (Luleå University of Technology), in Luleå, Sweden, where I mostly learned about composites and biocomposites, aerospace materials, and nanotechnology.
- The projects I worked on are :

❖ The elaboration of AlCuFe quasicrystals & application to inoculation (EEIGM)

❖ The leakage in the fuel tank (pressure vessel) of a space shuttle (LTU)

❖ Research proposal for : "Antibody modified nitrogen doped graphene as sensitive biosensor for Human ParaInfluenza Viruses 1 and 3 detection" (LTU)

- Through this training I have developed much patience, and I am able to work under very stressful conditions. I am now adaptable to live and work anywhere in this world (maybe outside it also).
- I am now working on the « Degradation of polymers under protons and electrons irradiations in a vacuum environment by using the in-situ ground testing methodology. »

EEIGM – 2020 Promotion

A part of my ERASMUS Family (13 nationalities in the picture) – LTU 2019

Interests and Motivation

- I am very interested into all what is related to Space Weather, Spacecraft environment interactions and on ground testing, Materials in Space, Space Power Systems, and also UNOOSA projects !
- Concerning the BIRDS-5 project, it is of utmost importance for me due to many reasons :

The project is the best way to learn about all aspects of building satellites and/or any kind of spacecraft. Then, uniting very high qualified people from all sides of the world (especially from my continent, Africa) can only be beneficial for all of us (it will get us through thin and thick, enhance our relationships, and this could even be greater as an experience than the technical skills acquired throughout the project itself !) . I am the first Master student from Université de Lorraine-EEIGM to participate in a BIRDS project and I am also the first Moroccan to work on a BIRDS project (I need to represent my country as best as I can as I may trigger an interest for/from Moroccan students if the project gets mediatized). I, therefore, feel blessed to get this opportunity as I even had just a little idea about it before coming to Kyutech.

So proud to raise my flag abroad !

And also very proud to be a member of Kyutech !

My Home City and Country : Casablanca, Morocco

- I am from the city of Casablanca, one of the biggest cities in Africa (12th), and the economic capital of Morocco : « Casablanca » became famous thanks to the 1940s movie with the same name that occurred in the context of the Second World War during which Morocco was still under French siege. Now Casablanca is known for the Hassan II Mosque (open to everyone), its traditional districts, the « Morocco Mall », and its Californian styled coasts !
- Morocco, the second oldest kingdom/monarchy in the world after Japan, is a colorful country where one can find all kinds of landscapes and contrasts : from Atlas snowy mountains, to urbanised coastal cities and rural disconnected-from-the-outside-world regions, through Sahara desert with billion-star-skies worthy of arabian nights ! Morocco is also a mix of authenticity and modernity, a flagship gastronomic destination (all of my friends can testify for me), and funny fact : the world's oldest Homo sapiens fossils were found in Morocco, which, until now, makes us all Moroccans !!!

The movie poster


« La Corniche », Casablanca


Moroccan Sahara Desert


High-Atlas mountain range


Oukaimeden winter sports station


Chefchaouen « the Blue Pearl »

My Life Objectives

- I would like to make at least one friend from each country in the world ! (I am quite halfway through with 89 countries over 195)
- I want to understand *anime* with no subtitles !
- I want to run a semi-marathon (21km) in less than 1h30 (my record is 1h:31min:59sec).
- I want to have a crucial role in the development of space research/industry in our world or at least in Africa (I believe it has a huge potential) : Being part of big projects is one of my main objectives.
- Helping to improve our society (in its globality) by any way, is a major goal for me.
- I want to lay a respectable image about Moroccan talents (and African in general) in the space domain, and maybe one day carve my name in it with golden letters.
- Even if I do many sacrifices, I hope I can have a stable personal life.

Morocco can be such a strategic point !

After finishing the 2018 semi-marathon of Erfurt (Germany) with my friend Justus (1h31mn59s)

During KOUDAISAI (Kyutech's Festival) : Morocco, Taiwan, and Vietnam represented ! (from left to right)

My favorite anime is ONE PIECE. I started watching it from 5 years old (in arabic), and it is still not finished !

Nakai Miori（中井美織）

- Name : Nakai Miori (call me Miori, Nakai…)
- Age : 23 years old
- My home town : Wakayama (next to Osaka)
- My research theme :

  To design DLP of CubeSat (DLP: Plasma measuring instrument)

My Home Town Wakayama

- **Characteristics of Wakayama**

  Wakayama Prefecture is rural and full of nature.
  Wakayama Prefecture is the largest producer of tangerines in Japan.

- **Personal data**

  My grandparents were tangerine farmers, so I grew up eating a lot of tangerines.
  My body is made of tangerines. ☺

Muroran Institute of Technology

MIT

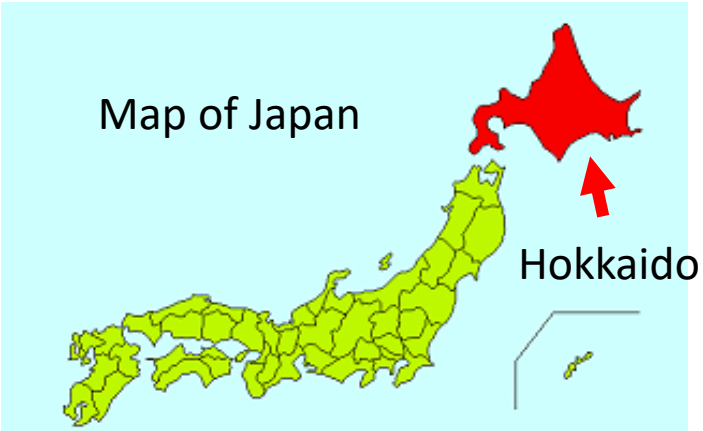
- **What is MIT ?**

  MIT is the university where I got my bachelor's degree.

  Location ：Hokkaido (Japan)

- **Hokkaido**

  Hokkaido is the northernmost part of Japan.
  It gets a lot of snow in the winter.
  There are many ski resorts.

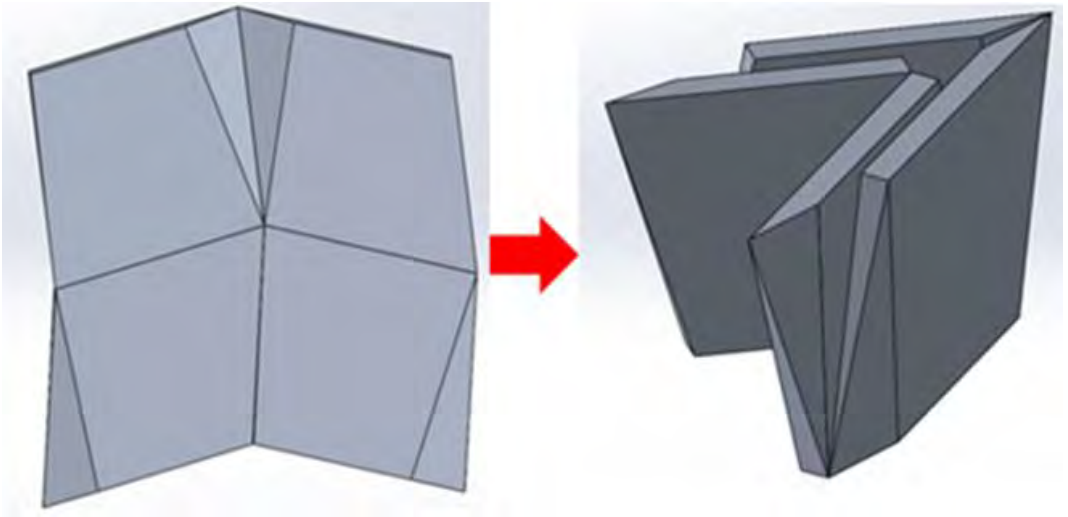


What have I learned at MIT?

Major
Aerospace Systems Engineering Course

Laboratory I belonged to
Spacecraft Structural Engineering Laboratory

Bachelor thesis theme
Folding Mechanism of Panel Structure
with Double Accordion Folding Pattern



Double Accordion Folding

What I like

I like sports!

High school
track and field club

College
cycling club
ballroom dancing club

My latest hobby
walking

running

cycling

Now: fat

walking

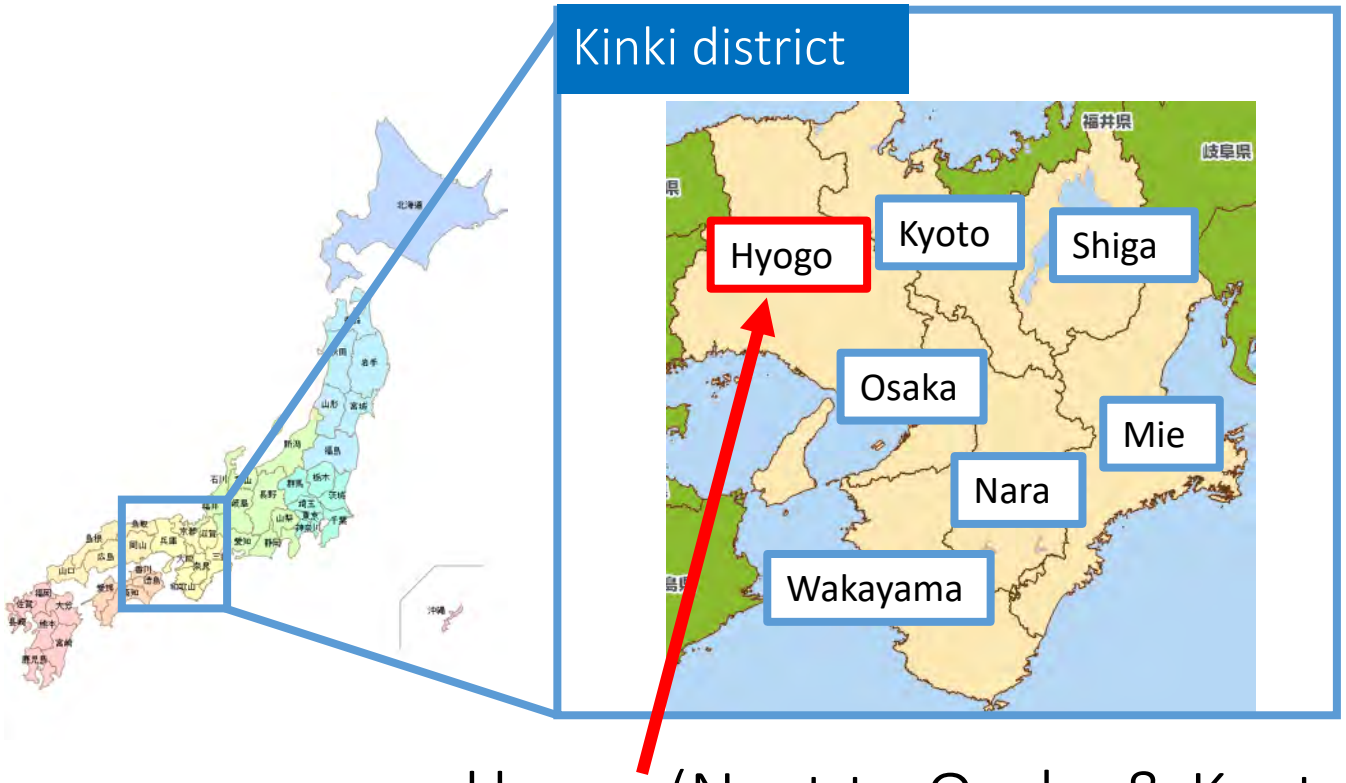
Kohei Kamitani

- Name : Kohei Kamitani
- Age : 22 years old
- My home town : Hyogo
- My research theme :

To examine the effects of radiation on satellite components

My home town Hyogo

Hyogo prefecture is
located in Kinki district.



Hyogo (Next to Osaka & Kyoto)

There are many
sightseeing places
in Hyogo:

Kobe (prefectural capital)

Himeji Castle

My hobby (1)

- **Cooking**

I like cooking and I cook dishes almost every day.

I want to try cooking various dishes from around the world.

My hobby (2)

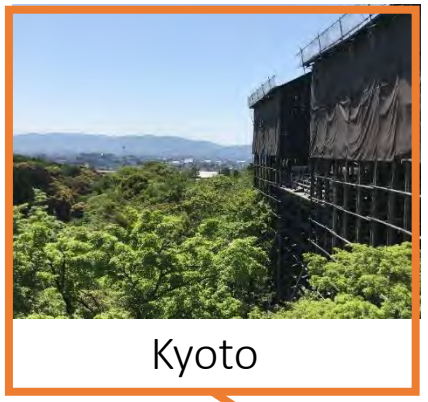
- **Traveling**

I like traveling.

My friends and I traveled round Honshu (the main island of Japan) by car in 2019.

It took 10 days to go around Honshu.

This trip was so fun.



Kyoto

Aomori

Tokyo

The reasons why I want to develop satellites

When I was high school students, I listened to a lecture about the Hayabusa Project.

In this lecture, I became interested in satellites and I thought that I want to try developing satellite.

Therefore, I'm so happy to be able to develop satellites with members of **BIRDS-5.**

Takashi Oshiro

- Years : 21 years old

  (Born: 1998/10/23)

- My home town : Okinawa

- My research theme :

Thermal design of satellite

Why I want to join the BIRDS Project

- I like to imagine the future of space. Space travel would be a common life in the future. I'm interested in the future of the space business.

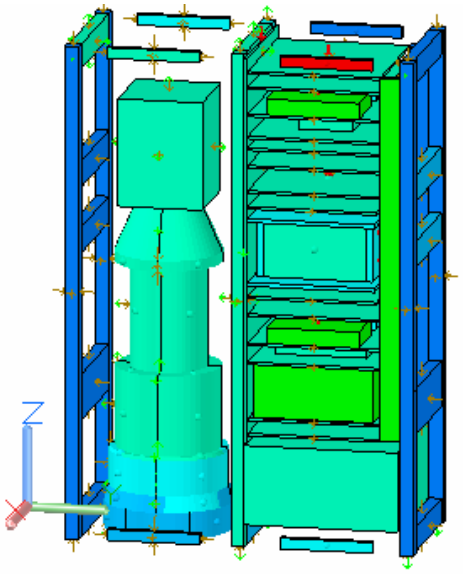
- Developing satellites with international member will be a good experience for me. I hope everyone stimulate each other, get skills through the project.

- I would like to say thank you for this opportunity. I’m so happy to join such an international project.

My research

- Thermal design of space craft
- I’m in charge of thermal design of KITSUNE satellite.
- KITSUNE has a high resolution camera to take a photo.

- In the orbit, satellite will be facing extreme environment. So before launch, Simulation and Environmental testing (thermal vacuum test) are needed.
- Especially, KITSUNE camera needs thermal control because temperature changes affect photo quality.



My favorite sport is “Football”

I had played football for 10 years.

My position was goalkeeper.

If I were taller...

I like playing sports.

My Home Town “Okinawa”

- Okinawa is located in the southwest of Japan.
- Beautiful ocean, traditional food, unique culture
- Summers are hot

https://iro-color.com/localcolor/prefecture-color/okinawa.html

It was great touring with a beautiful view of the ocean →

Yukihisa Otani

- Name : Yukihisa Otani (call me Yukihisa, Yuki, Otani…)
- Age: 21 years old (Born: Jan/11/1999)
- My home town : Yamaguchi
- My research theme :

  To design CubeSat Interface by CPLD

Why I want to develop satellites

I took part in a CanSat contest for a duration of 6 years in both junior high and high school. In one of the contests, I had the chance to meet Professor Cho. He once said "If the CanSat were a real satellite, you would not be able to repair it. Therefore, you must have it in its most complete form before you fly it. We have to aim to make complete and well-tested satellites."

His words were so cool and they inspired me. Then I thought that I wanted to join a satellite-building team. Since then, my dream has been to develop perfect satellites.

Prepare for launching CanSat

Getting a technical award

Kyutech FUTABA satellite project

- My role is Ground Station and Project Manager.
- Our Project did the cloud funding and we raised 2-million-yen for launching the satellite.

Presentation at Hakata

My hobby is travel

Let’s go to new places !!!

Tokyo

Korea

Tanegashima

Hokkaido

My Home Town Yamaguchi

- Yamaguchi is next to Fukuoka!
- The local food is “Kawara-soba”!!!

  Soba is baked on *Kawara* (tile).
- There are a lot of beautiful places.

Tsunoshima

Kintai Bridge

Kawara-soba

End of BIRDS-5 self introductions

by each student

We have a good team for the project, Editor

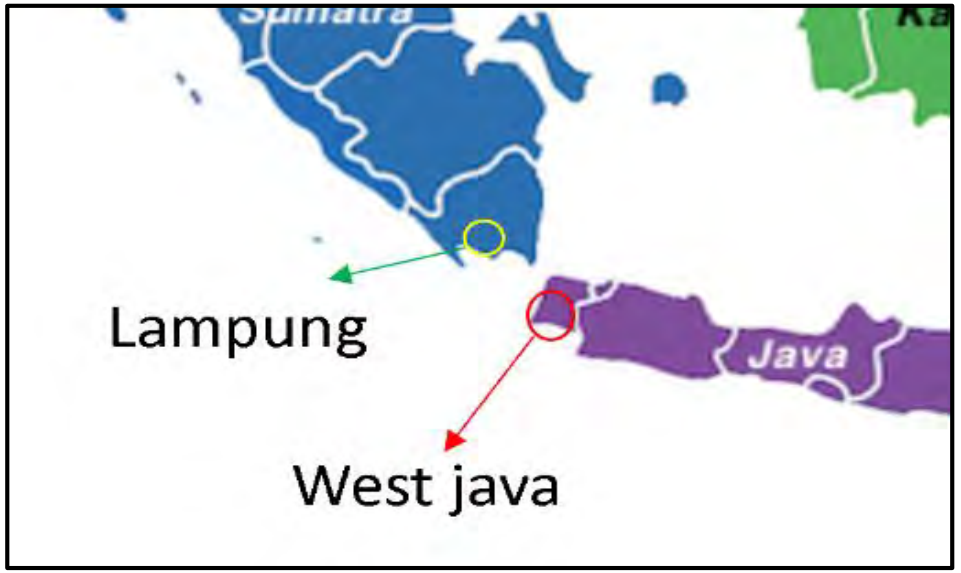
16. Report from Indonesia (Rahmi)

Rahmi Rahmatillah
Lecturer
Institut Teknologi Sumatera
Lampung, Sumatera
Indonesia

The following two pages are from Rahmi, who studied at SEIC as a master and Phd student. This report (14 July 2020) is an update on her life after going back to Indonesia.

New Normal Protocol and Social Distancing During Travel in Indonesia

Hello, I'm Rahmi from Indonesia, alumni of SEIC program for master and doctoral course (even though I haven't completed doctoral degree). Currently I'm working in a university in Lampung, Indonesia, called ITERA. It is located in a different island from my hometown (I came from West Java). So, I have to take either an airplane or ferry to go there. The weather in Lampung is very hot, almost like summer time in Japan, but imagine you have it for a whole year. Here are some pictures of Lampung and my current workplace. I don't usually take picture from my phone, so I have so little to show.



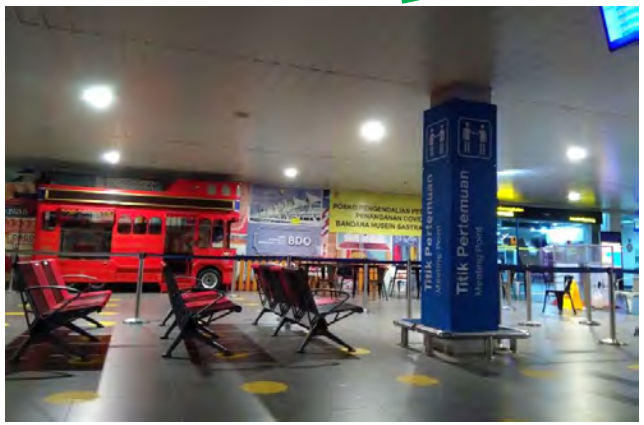
This is not the main gate, but it was recently built for the back gate of university garden

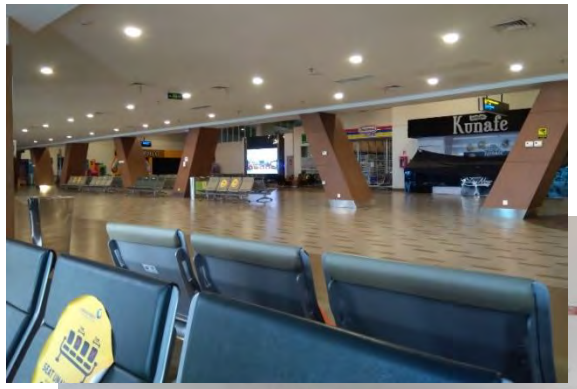
This picture shows several buildings inside the university. Usually I ride my motorbike to get to university from my flat.

Last month I had to travel back to my hometown by airplane, and because it was during COVID-19 pandemic, I faced a lot of troubles. But I will share several pictures during the travel. Usually, the airport and the airplane itself are crowded with people. But during travel restriction, I only spotted no more than 20 people at that time. I took a bus from Jakarta to my hometown, and the usual crowded, traffic-jammed Jakarta was not there. It was an interesting experience to travel during pandemic, but high risk of course. That was why we have to take rapid test, or PCR test before traveling to make sure we are healthy. Here are some pictures from an 'empty' airport.

Social distancing campaign

Usually this spot is crowded, but I hardly see anyone here





Since last month, we started to apply new normal protocol inside university, so all the staffs are required to work from office. But the classes are still held online, so the students are not encouraged to go to university unless there are some urgent business. I hope the situation will become better soon for everyone. *Sampai jumpa di lain waktu!*

← *Students and staff from telecommunication engineering major. This picture was taken before COVID-19 outbreak.*

17. ROCINANTES and how it connects with Kyutech

ロシナンテスとは

スーダンの地域社会の発展を目指していきます。
そのために、日本とスーダンを結びつけ、地域住民の協力を得ながら、既存にない新しき価値ある「もの」「こと」を創出していきます。
それが、スーダンに関係する国々にも広がっていくようにします。
そのプラットフォームとなるのが、ロシナンテスの役割です。

ROCINANTES

Reminder that:

ABE, Kyutech, BIRDS, Dr Kawahara, Rocinantes, ISRA (Hind's employer), SEIC, and LaSEINE, are all connected in some way. For more details, see BIRDS Project Newsletter No. 41, Pages 20 and 21.

SEIC Student Hind and Dr Kawahara on 9 June 2019

GM and Kawahara sensei at outdoor café

G. Maeda with Dr Kawahara in Khartoum, Sudan, on 7 Oct. 2015.

18. Report from Bangladesh (Kafi and Antara)

Photo by G. Maeda on 27 Nov. 2019

The following two pages form an update report from Bangladesh. This report is from Kafi and Antara, who built BIRDS-1 for BRAC University of Bangladesh (2015-2017).

Last year November 2019, the BIRDS Community met in Bangladesh for its annual get-together through the **4th BIRDS International Workshop**
This is the first workshop in the field of space technology to be held in Bangladesh where international delegates attended. As it was interdisciplinary, the event provided an excellent opportunity for the students to gain experience. The workshop has inspired a number of young people to consider involving themselves within the creative industry.

As part of the Brac University's Plan, we want to engage our students and inspire to get creative in the local community and help them along the pathway to discovering their passion. Brac University recently took two initiatives to *engage students more in space exploration through STEM learning.*

4th BIRDS International Workshop

Laboratory of Space System Engineering & Technology (LaSSET)

- To continue the satellite research in Bangladesh, Brac University established its own ground station and lab in 2017.
- Students and faculties are doing research and tracking satellites regularly from this lab.
- We are happy to share with you that, to mark the 3 years of Brac Onnesha Launch, we have decided on an official name of the lab which will more focus on the mission and vision of Brac University's satellite research.
- The name is "Laboratory of Space System Engineering & Technology – LaSSET"
- This Lab is under School of Engineering, Brac University

Website: Under Construction

Facebook page link: www.facebook.com/braculasset/

IEEE Aerospace and Electronic Systems Society (AESS) Brac University Student Branch Chapter

- On 8th June, The Institute of Electrical and Electronics Engineers (IEEE) approved a petition for the opening of a new student branch chapter named **IEEE Aerospace and Electronic Systems Society (AESS)** Brac University Student Branch Chapter.
- This new chapter is the first of its kind in Bangladesh
- **Abdullah Hil Kafi,** Engineer of Brac Onnesha Satellite is acting as the advisor of this chapter
- EB members are the students of Brac University
- Meet the team: https://www.facebook.com/ieeebracuAESS/videos/2982226741296172/

Facebook Page Link:

https://www.facebook.com/ieeebracuAESS/

19. Report from El Salvador

The following report about the space sector in El Salvador was written by Fatima Gabriela Duran Dominguez. She introduced herself here:

BIRDS PROJECT NEWSLETTER

Issue No. 53, pages 9-15

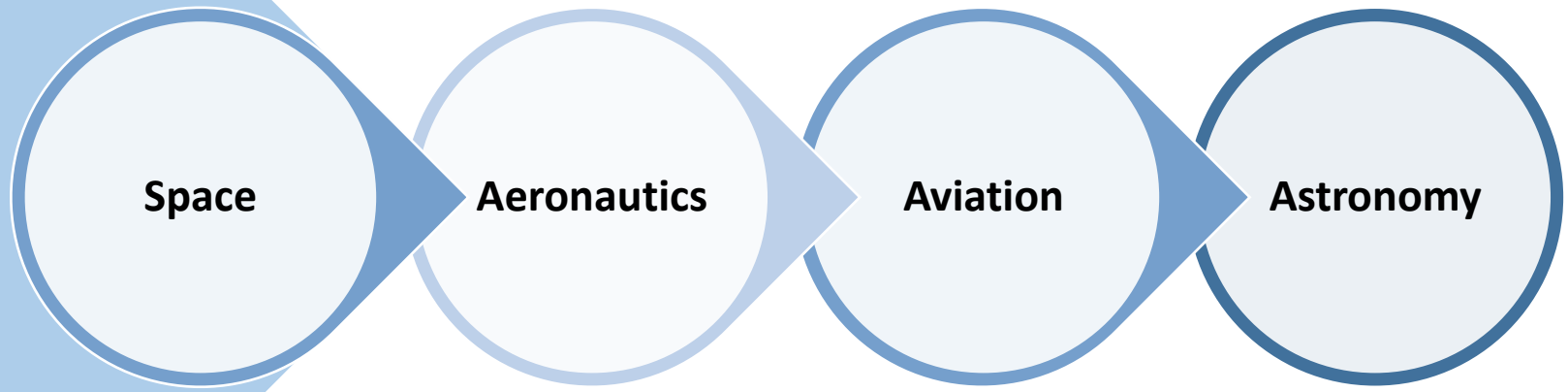
She joins PNST-SEIC in the fall of 2020.

El Salvador

CURRENT STATUS OF SPACE SECTOR IN EL SALVADOR

The space race has been developing over the years, and many countries have been able to develop their technologies and use their results to benefit their societies. El Salvador is no exception. Some efforts to develop the aerospace industry in El Salvador have been made from different sectors of the society such as academia, private companies, non-profit, and government institutions. The present article explains some of these efforts in the main fields of space technologies, aeronautics, aviation, and astronomy. Although currently there has been an increasing interest in the use and development of space technologies, we still have to do more efforts to place the country as one competent space-fairing nation.

Current development of space sector in El Salvador



Space

USE OF SPACE TECHNOLOGIES

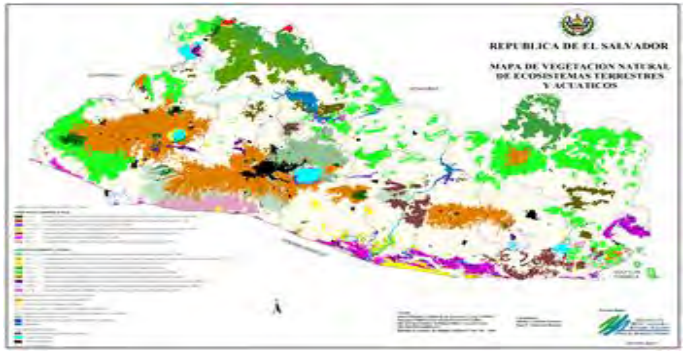
- **Use of satellite technology in El Salvador**

The satellite technology is been used in different sectors. However, the satellite data is being provided by other countries and foreign companies, since the industry is not developed yet in El Salvador. The uses of satellite data and providers are mainly the following:

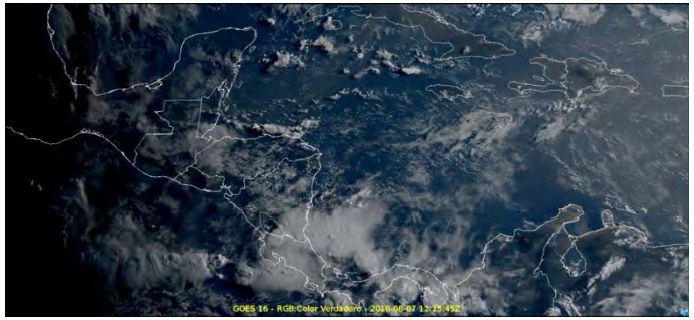
— Weather monitoring, by NOAA.

— Land use monitoring, by ESA & JAXA.

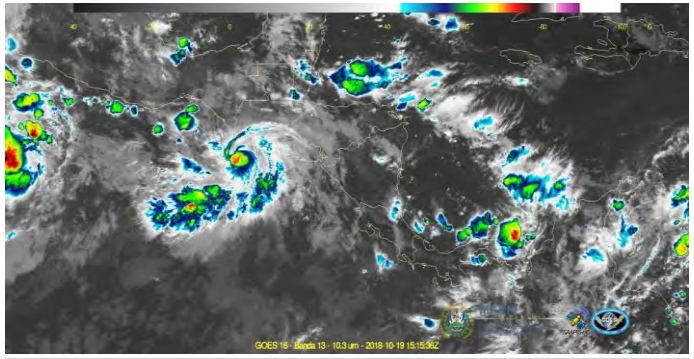
— Satellite imagery, and positioning and navigation, by commercial providers.



Mapping of the natural vegetation of terrestrial and aquatic ecosystems. Source: Ministry of Environmental and Natural Resources of El Salvador.



Geocolor satellite image capturing Central America. The satellite imagery in the region is produced from the Operation Environmental Geostationary Satellite (GOES-16). Source: Ministry of Environmental and Natural Resources of El Salvador.



Infrared image (Band: 13) of Central America. This image is based on a 10.3 micron wavelength. Source: Ministry of Environmental and Natural Resources of El Salvador.

- **El Salvador Aerospace Institute**

El Salvador Aerospace Institute (ESAI), a non-profit organization, has the purpose to lead and support the development the aerospace industry and "contribute to the national economy of El Salvador and improve the quality of life of its citizens".

- **Project Esfera**

It consisted of the launch of high altitude balloons equipped with camera and locally made tracking systems. The first successful launch was on December, 2013.

Esfera-3. View from ESAI's third high altitude balloon launch. Source: ESAI

TER-1C rocket. Torogoz Sounding Rocket Project, design and development team. Source: ESAI

El Salvador | Space Generation Advisory Council (2020). Available at: https://spacegeneration.org/regions/north-central-america/el-salvador (Accessed 13 July 2020).

- **Project Torogoz**

It is a Sounding Rocket Project which was conceived in 2011 as research program which include different sectors such as academia, government institutions and industry. It aimed to design and manufacture "a series of civilian sounding rockets with increasing complexity and capability".

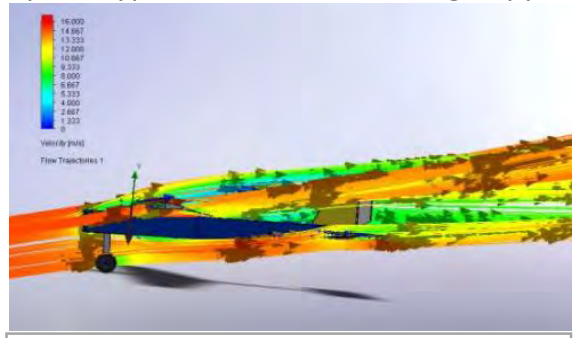
Aeronautics

RC FLYER, ELECTRIC HAWK

- **RC Flyer Project**

The RC Flyer, a aerobatic aircraft prototype, consists of a radio-controlled Unmanned Aerial Vehicle (UAV). This project, that represents the first Salvadoran RC aircraft, was lead by Alfredo Morales, professor, and five engineering students at Universidad Don Bosco (UDB). The RC Flyer, has an original design, taking as a basis previous work of Notre Dame University, in the United States. The team made significant improvements to provide greater design reliability, structural strength, low-weight, and positive dynamic stability, to ensure a stable and safe flight. Moreover, the project aims to give a basis for decision-making processes as well as to outline some methods, equipment, design, and analysis tools for future projects.

More specifically, the project of the RC Flyer aims to promote the growing boom in aeronautics in El Salvador through a prototype of radio-controlled acrobatic aircraft and to encourage young students to develop their aircraft prototypes with different design approaches.



Simulation performed using the CFD of SolidWorks. The analysis was performed for different angles of attack.

The RC Flyer, this project provides guidelines for future development of aircraft prototypes.

- **Electric Hawk**

Electric Hawk is the first Salvadoran company dedicated to the design and construction of drones and UAVs. Their services include aerial photography and video for areas such as precision agriculture and video surveillance, and maintenance and modification of supply parts for radio-controlled aerial vehicles. The company, co-founded by Salvadoran Ronald Marroquin and Jairo Mena, started thanks to their passion for aerial vehicles and their multiple uses that they can have in El Salvador.

- **Present and Future Projects**

Their first project, Spider DT5, is an octocopter able to carry until 5 pounds of payload. Currently, they have been developing more projects, but although these projects have completed design and manufacturing, on-field testing has not been performed yet due to Covid-19, explains Mr. Marroquin. Among these projects, there are Centinela, Electric Eagle, and a multicopter based on the Spider DT5. The first, Centinela, developed alongside students from Universidad Don Bosco, is a V-TOL for vigilance of 1.5 meter of span and can carry until 3 pounds of payload. The second, Electric Eagle, is an experimental plane of 3 meters of span which can reach up to 8 pounds of payload, designed for testing agricultural and heavy duty surveillance technologies. The last project is a multicopter for agricultural services. In the future, they expect to provide El Salvador's industries with more drones that meet the main requirements such as low-maintenance cost, high resistance, and customer-oriented design for special payloads.

Spider DT5, Electric Hawk's first multicopter. Mr. Marroquin (left) and Mr. Mena (right) with the Spider DT5.

Alcantara, M. et al, (2019), *RC Flyer*, Soyapango.

- **Recent News for the aviation industry in El Salvador.**

The Civil Aviation Authority (CAA) of El Salvador has managed to continuously extend Category 1 by the Federal Aviation Administration (FAA) of the United States. Mr. Javier Ascencio, State Safety Program Head at AAC, provides his insight about of the categorization process, short and long-term benefits, and challenges for the aerospace industry in El Salvador.

According to Mr. Ascencio, the categorization process consists of "*a detailed review that determines whether the requesting State complies with the Standards and Methods recommended by the International Civil Aviation Organization (ICAO). In this process, in turn, the National Civil Aviation Authority (CAA) is evaluated in its mission to supervise and monitor the safety of the State Civil Aviation System*".

Term	Benefits for El Salvador
Short	• Already established airlines in El Salvador can continuously operate towards US, and new national airlines can be certified to operate towards US. • Aircraft maintenance services can keep and receive more clients from the US.
Long	• National airlines will be able to open to routes to different destinations within the US.

Staff of the Civil Aviation Authority of El Salvador. Category 1 provides the country a competitive advantage and economic contribution.

- **El Salvador's aerospace industry and future challenges.**

The future of aviation and aeronautics in El Salvador is promising according to Mr. Ascencio. He points out that the country "maintains a very strong leadership in the Central American region" because it is a HUB for different connecting flights from and to different regions within North, Central, South America, and the Caribbean. Besides, he sustains that this makes El Salvador "a very important tourist and economic destination" which greatly helps the future growth of the aeronautical industry. Moreover, he explains that the most important Aeronautical Maintenance Center is located in El Salvador, which provides maintenance services to aircraft from different regions of the American Continent.

Also, Mr. Ascencio explains that the country has some challenges ahead regarding the aerospace industry. Among these challenges, he explains that the government should provide more investments "to train the human capital necessary for the development of this industry". He also believes that due to the continuous growth of the aeronautical maintenance services, it is necessary to create more maintenance schools for the training of future technicians, as well to grant scholarships to young people from low-income households. Moreover, he mentions that as the first generation of aeronautical engineers has recently graduated from one of the aeronautical schools, they need the government support to further develop the aeronautical industry and to be able to contribute to existing companies such as airlines and maintenance workshops.

AEROMAN, the biggest MRO holding in the Americas. It is currently looking for aeronautical engineers to provide aeronautical engineering related services to foreign companies.

Astronomy

MICRO-MACRO OBSERVATORY

- **Micro-Macro Observatory**

Micro-Macro Observatory (OMM, in Spanish) is a science center that focuses on Astronomy and related areas and allows its visitors to study and observe the micro and macro dimensions of the universe.

It is located within the Don Bosco University campus in the municipality of Soyapango, at the Karlheinz Wolfgang Science Center for Technology, Optimization and Professionalism.

- **Facilities & Equipment**

It gathers the most modern and powerful astronomical equipment and accessories in El Salvador and in the Central American region, for the tasks of observing the universe. Its facilities include a reception area, planetarium, astronomical observation tower, projection room, observation terrace, and experimentation rooms.

Main facilities at the MMO

Planetarium, space designated for astronomical presentations.

Observation Tower, houses all the technology for astronomical observation.

RC 20. Main telescope, it is a high-quality professional telescope, ideal for research and astrophotography.

Observation Terrace, allows groups of people to do astronomical observations using portable telescopes.

OMM - OMM (2020). Available at: http://omm.udb.edu.sv/omm/public/ (Accessed: 7 July 2020)

Training

Position Astronomy and Astrophysics Workshops

- Taught by certified instructors by the IAU, includes the teaching of basic astronomy concepts and handling of telescopes.

Optical Microscopy Workshops

- Lead by an specialist in cellular microbiology, this workshop allows people to learn basic concepts of the microscopic universe as well as observation tools.

Network for Astronomy School Education (NASE) Workshop for Educators

- Sponsored by the IAU, it is a course of astronomy didactics intended for the training of primary, secondary and higher education professionals.

Micro Universe: Rooms 1 and 2 are equipped with high-tech microscopes. Here various training and workshops take place.

END OF REPORT FROM EL SALVADOR

20. Q2 2020 briefing from Bryce

The **Briefing** details launch and satellite updates, including smallsats, and the global launch industry.

Bryce Space & Technology
1199 North Fairfax Street
Suite 800
Alexandria, VA 22314
USA

https://brycetech.com/briefing

21. Report from Paraguay

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

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

Newsletter

News from Paraguay
July 2020

Contributors:
Members of
The CABURE+I 4S Project Team

Edited by:
Blas Vega

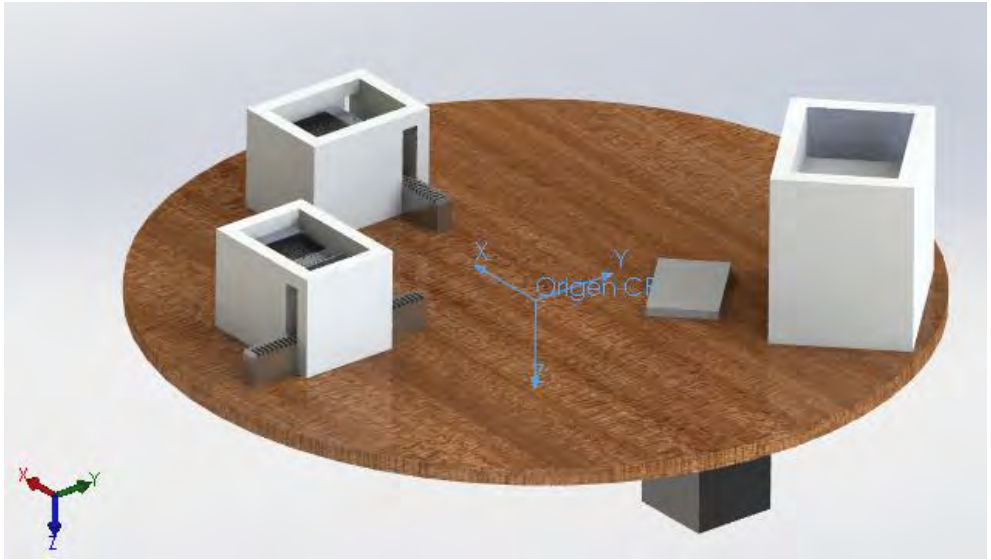
FIUNA FPUNA UNG

Paraguay Space Agency

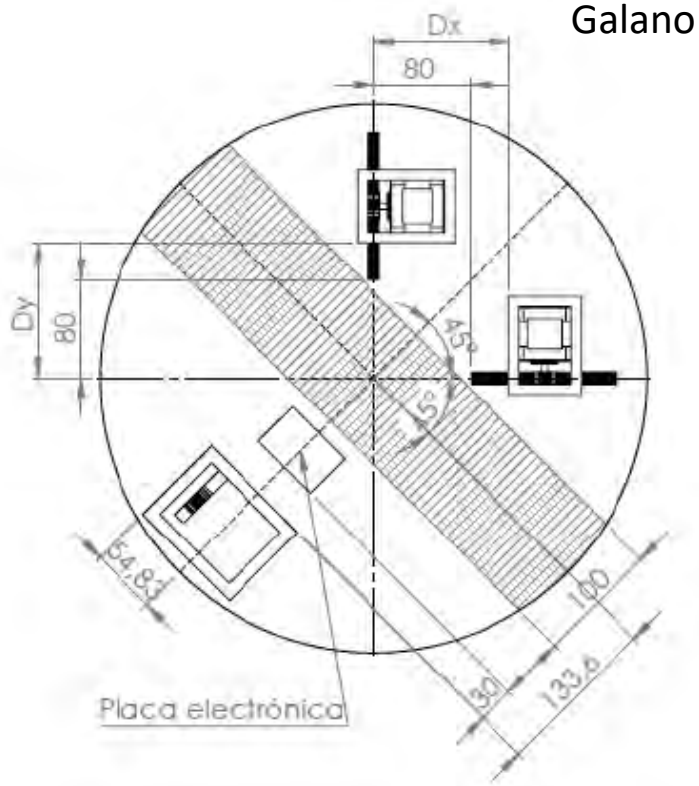
Tittle: Analysis and Design of an Automatic Mass Balancing System

Contributors: E. Fretes, A. Galano

This platform is designed to be used on top spherical air bearings. In order to balance the platform, two main numerical calculations were performed for the main actuator positioning.



Platform Simulation



Platform Top View

The “CABURE+I 4S” Project Newsletter
News from Paraguay

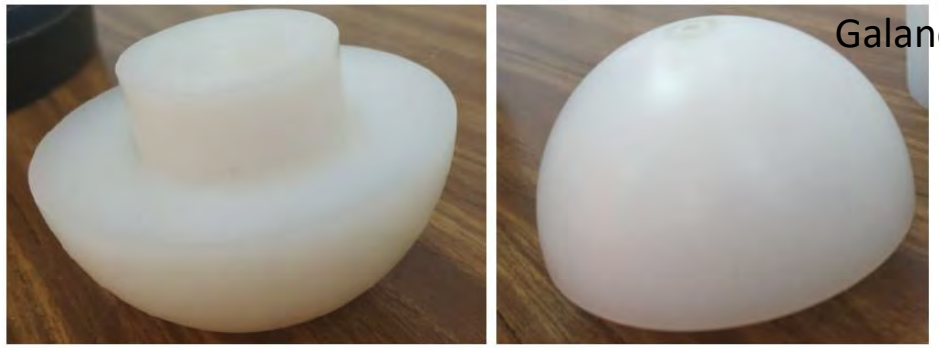
Tittle: Analysis and Design of an Automatic Mass Balancing System

Contributors: E. Fretes, A. Galano

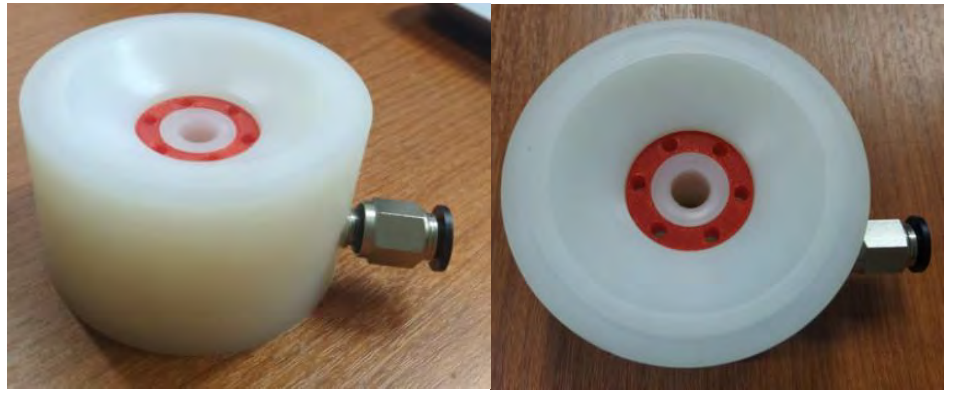
Prototype design of an automatic balancing system mass for a frictionless platform with three degrees of freedom is presented.

This project addresses the implementation of a platform without friction as a test bench for nanosatellite ADCS.

The equipment used to manufacture the bearing pneumatic components, was a numerical control lathe, a numerical control milling machine, as well as other lathes and manual milling machines available at the school machine shop.



Hemiesphere



Active Part

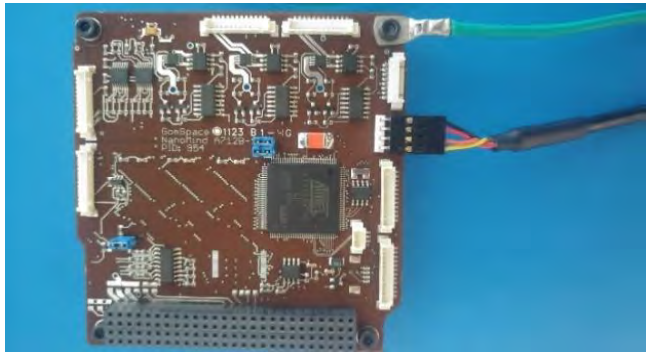
The “CABURE+I 4S” Project Newsletter
News from Paraguay

Tittle: Implementation of Contact Graph Routing Algorithm on a flight On-Board Computer

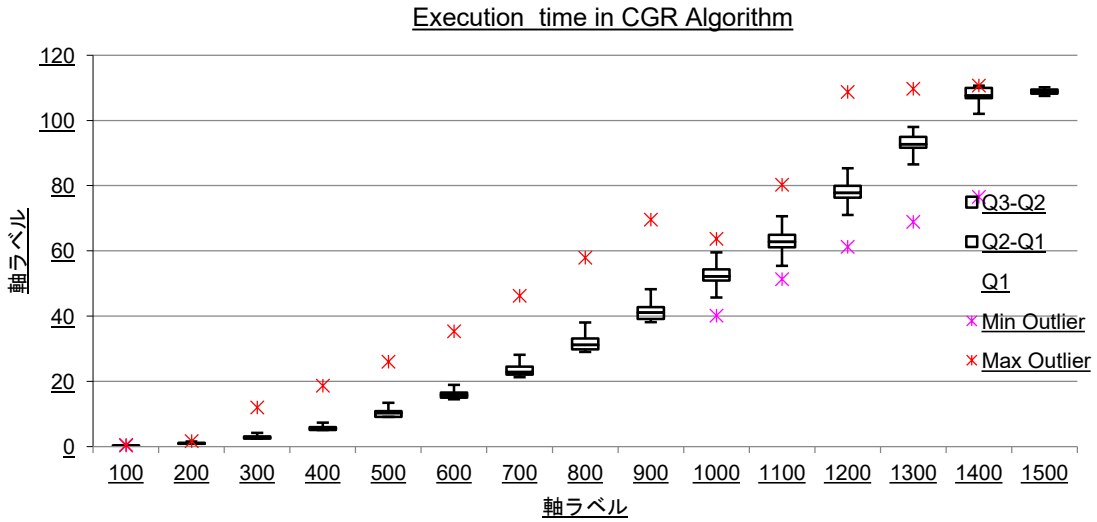
Paper accepted for oral presentation at the Small Sats Conference 2020 Utah University, USA.
https://smallsat.org/

Contributors: B. Vega, J. Fraire

Delay/Disruption Tolerant Networks (DTNs) have recently been considered as an alternative to extending Internet boundaries into space. The CGR algorithm implemented in C language in a condensed, abbreviated way, a simplified version of the algorithm implemented in the ION software using Dijkstra’s algorithm as core is capable reading a contact plan in a satellite constellation and find the best route for Store&Forward missions and able to run on a limited flight computer as is the NanoMind A712c.



NanoMind A 712c OBC



The figure shows the execution time of CGR algorithm vs. number of contacts between nodes. This nodes may be satellites, ground stations or even other space crafts on Mars. The goal is to know the characteristics, the scalability of the core of the CGR algorithm and evaluate parameters of performance

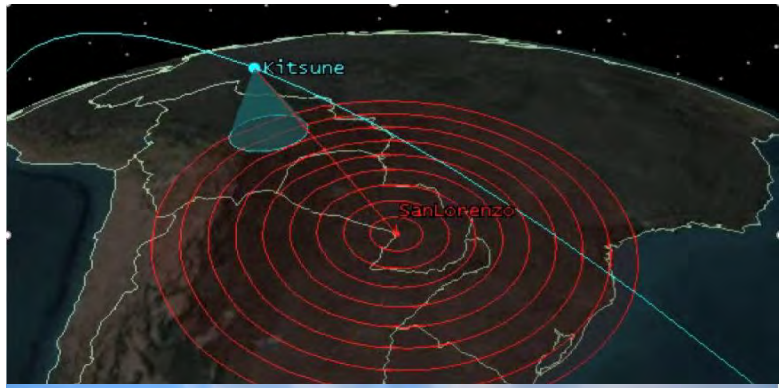
News from Paraguay

Working for Project KITSUNE !

Contributor: B. Vega

In Paraguay we are working on the first simulations for the development of the ground terminal that will send data collected by sensors distributed in a local forest reserve to measure the health of vegetation and air quality. Similar to the Irazú project in Costa Rica, it will be an environmental service that will lay the foundations for future research on the dynamics of the ecosystem on San Rafael National Park.

We believe that it is of great interest to advance in technologies applied to environmental conservation and spread these ideas to the greatest number of people so future generations will have the opportunity to enjoy the views that we are enjoying now.



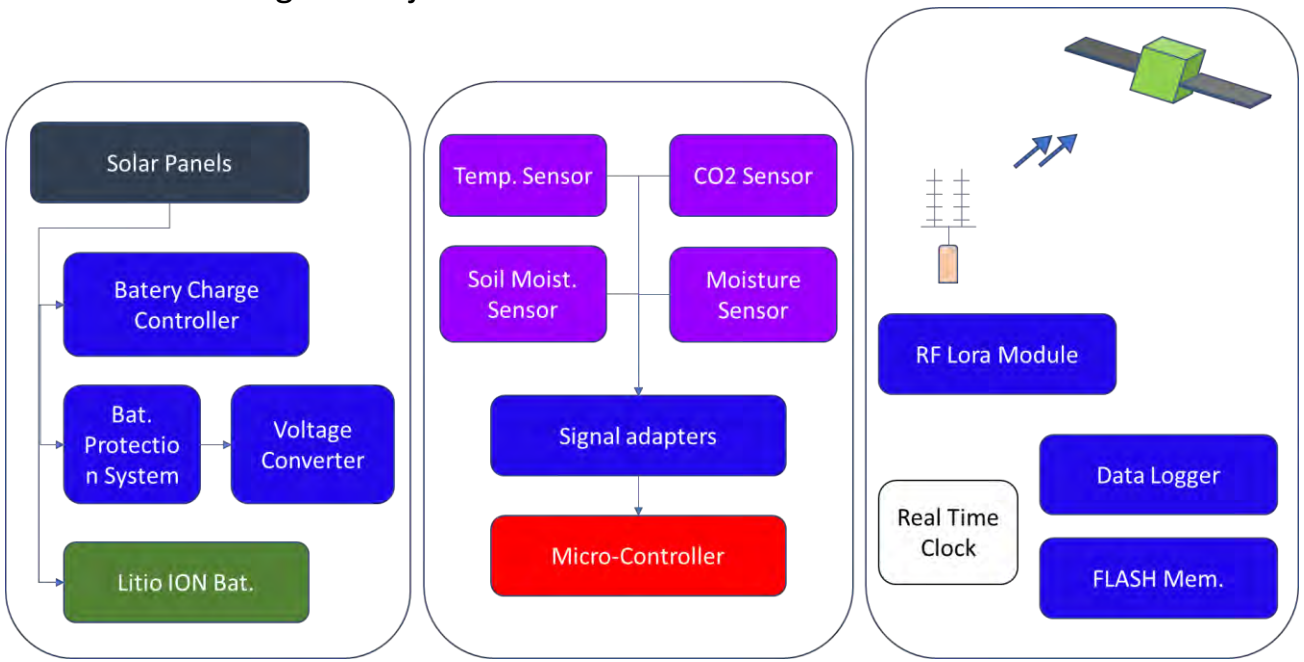
https://procosara.org/es/san-rafael

The “CABURE+I 4S” Project Newsletter
News from Paraguay

Contributor: B. Vega

Working for Project Kitsune!

We are working on the modules of the power system through solar panels that had already been used in previous projects, and at the same time, we are defining the list of components to be used according to the definition of the mission. We think that it should be a cheap enough prototype so that it can be replicated in the future for academic purposes in institutions interested in monitoring remote parameters for disaster prevention.



Contributor: B. Vega

Finishing Details on Birds 4 Antenna Ground Station!

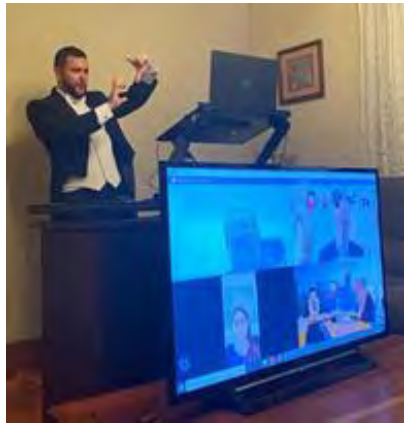
The assembly of the ground station instruments and equipment were done by Luis Miranda and Javier Ferrer.

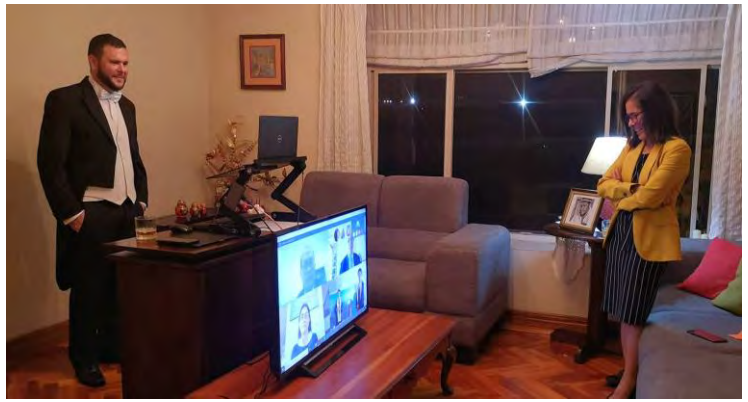
END OF REPORT FROM PARAGUAY

22. Adolfo (TEC) defended his Phd thesis

BIRDS Network member Adolfo defended his Phd thesis on 26 June 2020, 10 AM Netherlands time (2 AM in Costa Rica)

Captured on video – see the link below





Thesis defence "On the Coupling of Orbit and Attitude Determination of Satellite Formations from Atmospheric Drag. Observability and Estimation Performance" by Adolfo Chaves-Jiménez.

Promotor Prof Dr. Eberhard Gill.

Supervisor Dr. Jian Guo

The thesis document is available at the TU Delft repository:
https://repository.tudelft.nl/islandora/object/uuid:c333497d-05ac-422f-9688-31246a6fa7b1?collection=research&fbclid=IwAR0_gabUURMMW8WRtoLgXL8zyc_fCt6RVDgnx957TrCG7NpS8aCtPUN319I

This defence was done remotely due to the Covid-19 pandemic situation.

Contact:

Adolfo Chaves-Jiménez
Lecturer/researcher
Costa Rica Institute of Technology
adchaves@itcr.ac.cr

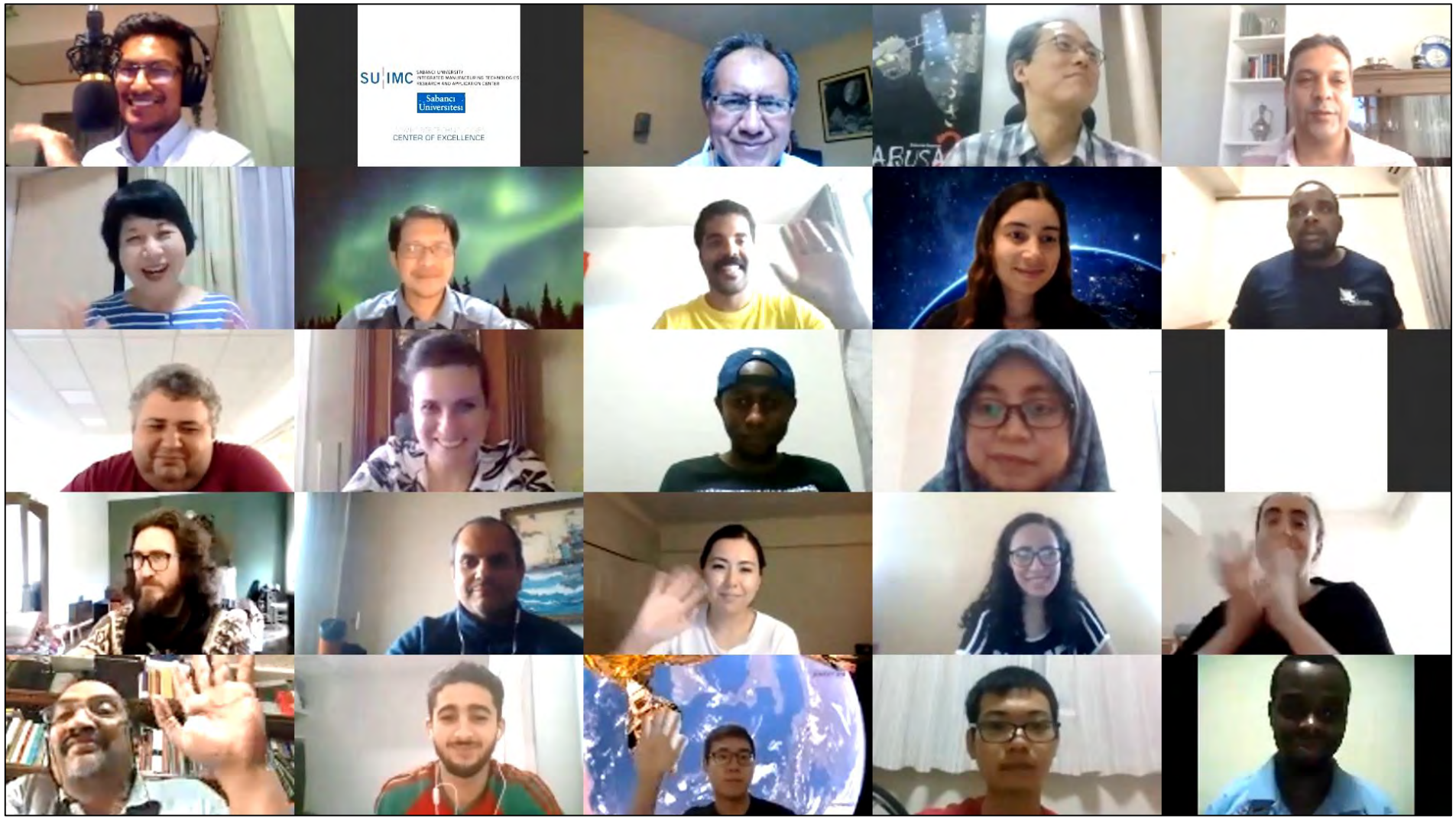
TU Delft
Delft University of Technology

Defense of the thesis at YouTube:

"PhD Thesis Defence Adolfo Chaves-Jiménez Space Systems Engineering TU Delft"
https://www.youtube.com/watch?v=DXozF8WREmw&feature=youtu.be&fbclid=IwAR3ey17JczOaRSxOjySo-OlUWZ7Xsn6cye93bCcxyvo1WGZQr20o5OqNHZA

The thesis was successfully defended.
Congratulations, Dr Adolfo !

23. UNISEC Virtual CLTP Alumni Meeting: Report by Abhas, Nepal



By Abhas
(BIRDS-3, Nepal)
14 July 2020

UNISEC
University Space Engineering Consortium

CanSat Leadership Training Program Meeting-2

UNISEC organized the second **CanSat Leadership Training Program Meeting (CLTP)** 2 on July 11, 2020. This time, members outside the CLTP community were invited to join as well as there were special lectures.

AGENDA

UNISEC
University Space Engineering Consortium

Time (Japan)	Agenda	Notes
22:00-22:05	Opening and Welcome (Mansur Celebi CLTP1)	Moderator: Abhas Maskey (CLTP7)
22:05-23:00	**Deep space explorer's 20-year journey from ARLISS (CanSat) in 1999 to Hayabusa2 in 2020** (Prof. Yuichi Tsuda, Project Manager for Hayabusa2 of ISAS/JAXA)	Includes Q&A session (Please ask questions using "chat" during the presentation. Moderator will read the questions.)
23:00-23:20	**Application of International Law for Small Satellite Activities** (Atty. Nazil Can)	Includes Q&A session
23:20-23:40	**Regional Report-Malaysia** (Norilmi Amilia Ismail, CLTP8, UNISEC-Malaysia)	Includes Q&A session
23:40-23:50	Announcements and News (TBD)	
23:50-24:00	Closing remarks, scheduling (Rei Kawashima)	

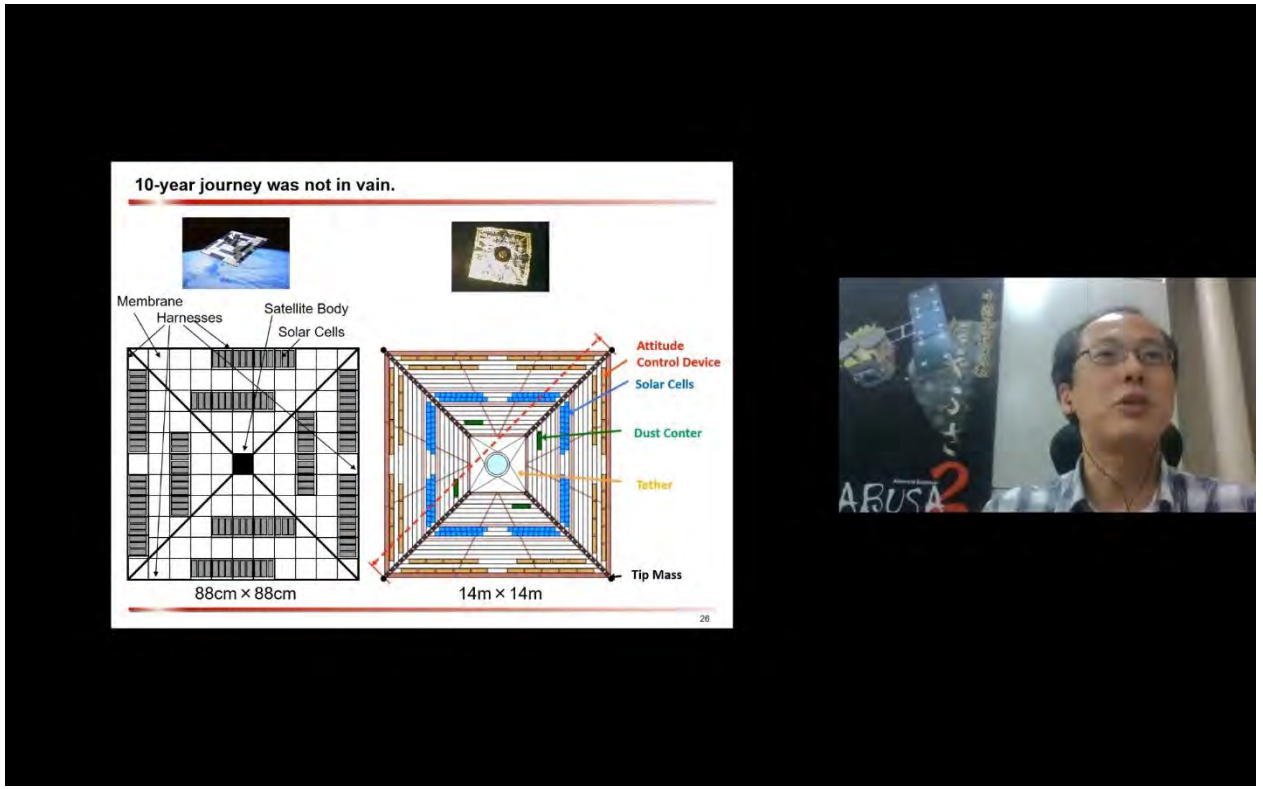
<u>100 Registrations, 30 different countries</u>

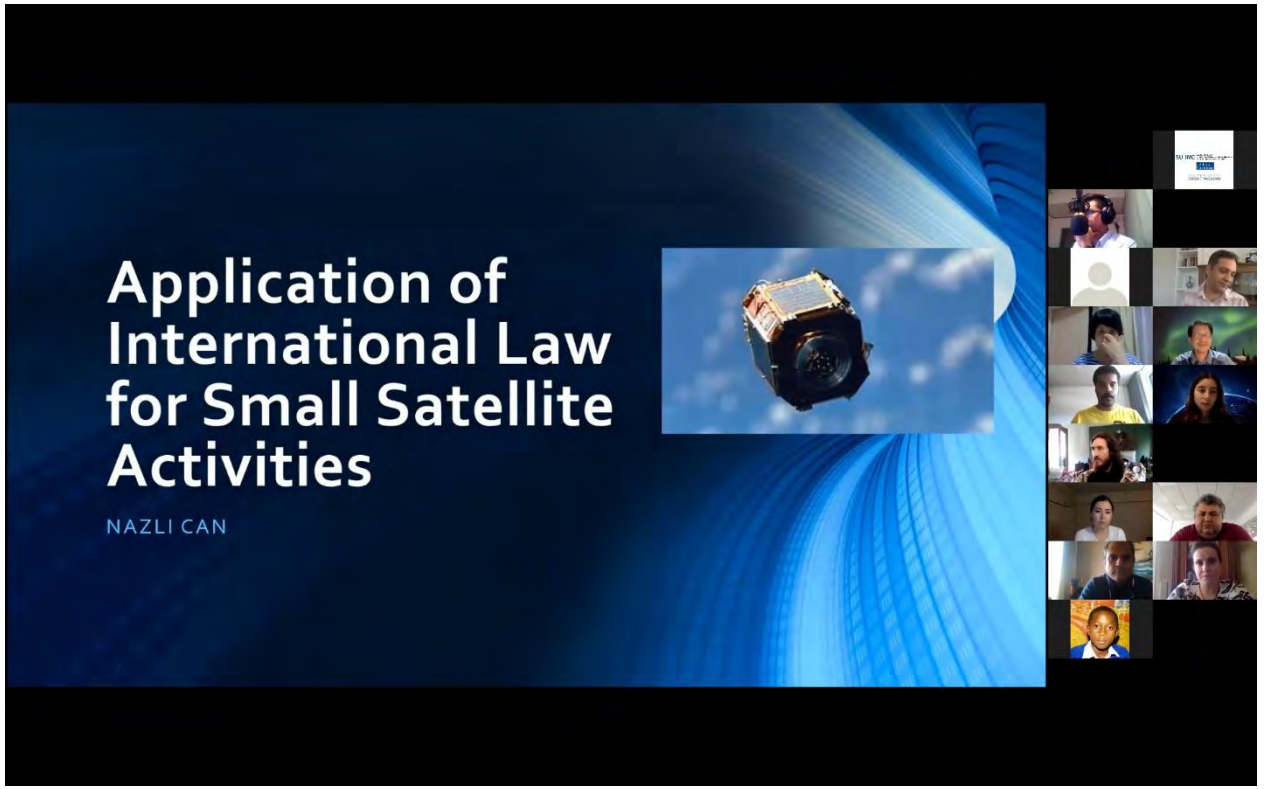
Rei Kawashima

Dr. Celebi (CLTP-1)

Abhas (CLTP-7)

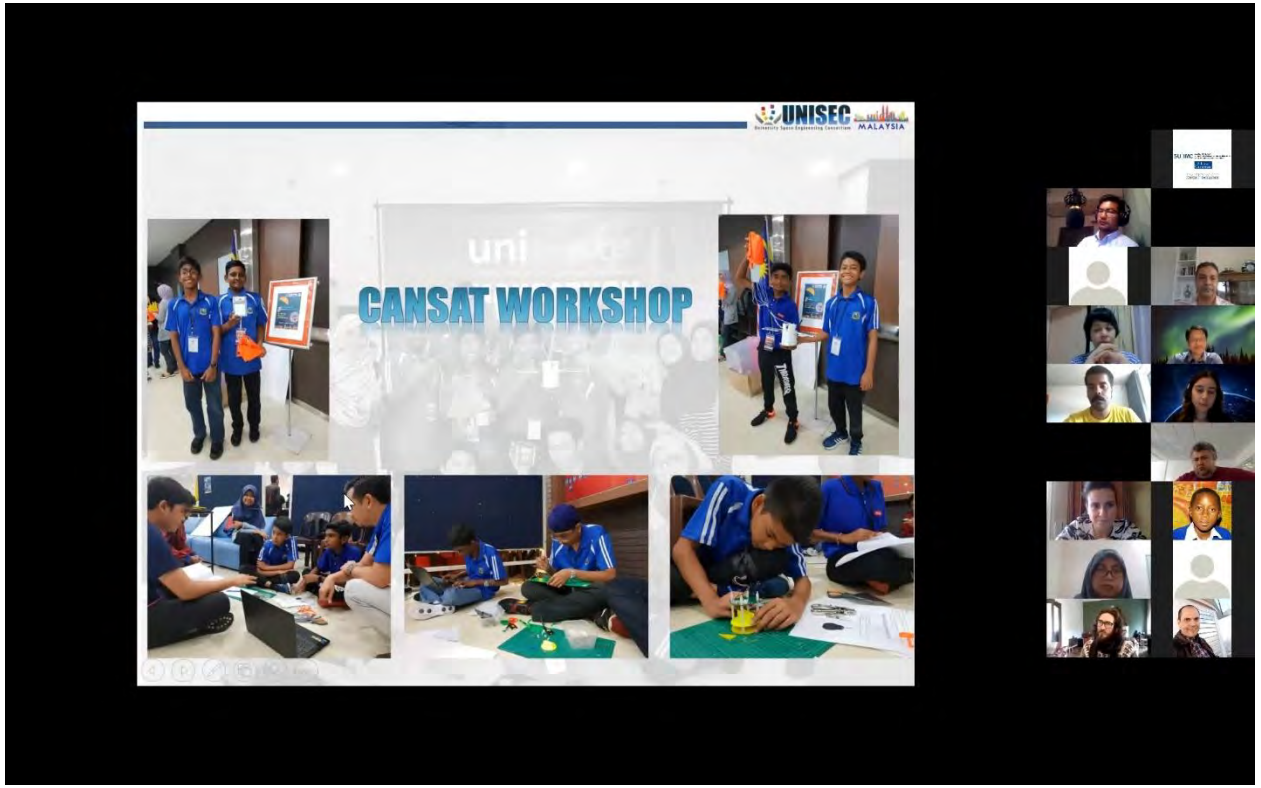
Hosting Team



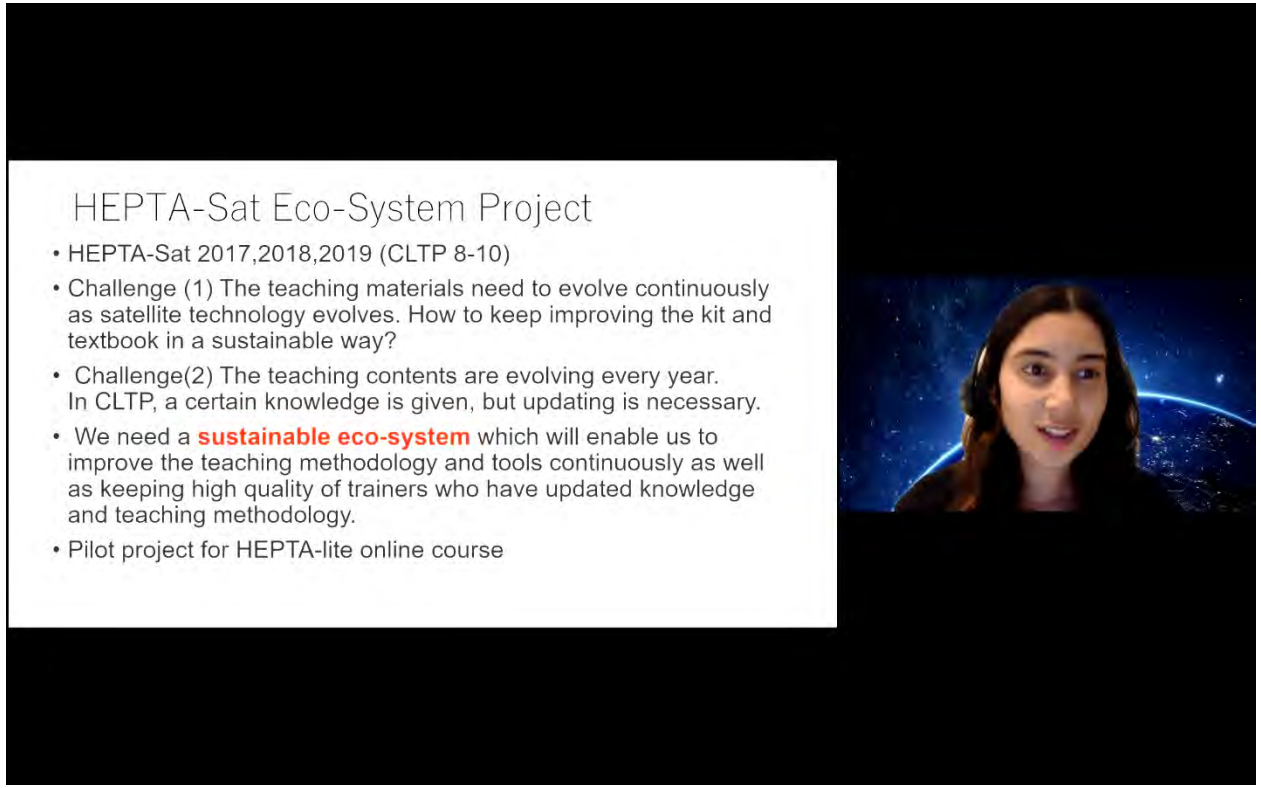


Dr. Yuichi Tsuda (Japan) is the Project Manger for Hayabusa-2 Asteroid Project in JAXA. Dr. Tsuda started out with CanSat, competing in one of the first CanSat competitions called ARLISS in USA. He went to work on the first CubeSat project in the world and then pioneered work on solar sails. He's now working for deep space missions.

Attorney Nazli Can (Turkey) talked about **Application of International Law for Small Satellite Activities.** This is especially going to important as more satellites are going to be in orbit than ever. Issues of damage, debris mitigation and frequency coordination among different nationalities are going to come fore in the future.



Dr. Norilmi Amilia Ismail (Malaysia) is a graduate of CLTP-8 (HEPTA-Sat) program from UNISEC. She's been involved heavily in training the next generation of Malaysians. Since taking the training, she has launched a number of CanSat workshop including designing and manufacturing her own kits for the kids to use and learn.



Rei and Natasha are forming a group of volunteers for the HEPTA-Sat Eco-System Project. As CubeSats evolve, CanSat trainings have to evolve to bridge the gap between working on a space and non-space system. UNISEC requests anyone interested to be involved in building and launching the next generation of CanSat training course.

My experience:
UNISEC Virtual CLTP Alumni Meeting
of 11 July 2020

By Ramson Munyaradzi Nyamukondiwa (BIRDS-5, Zimbabwe)
PhD Student
14 July 2020

Virtual CLTP Alumni Meeting Invitation to Kyutech

- UNISEC GLOBAL invited SEIC students via Prof Maeda: Virtual CLTP Alumni Meeting

[SEIC] Invitation to participate in the 2nd Virtual UNISEC CLTPAlumni Meeting

GM George Maeda
Thu 7/2/2020 10:05 PM
To: SEIC students mailing list <seic-student@space-kyutech.net>

To all SEIC Students:
I have been asked to circulate the following announcement
from UNISEC. Please make the effort to read it
as it may prove to be your worthwhile to participate.
: G. Maeda

Participants

Hosting team

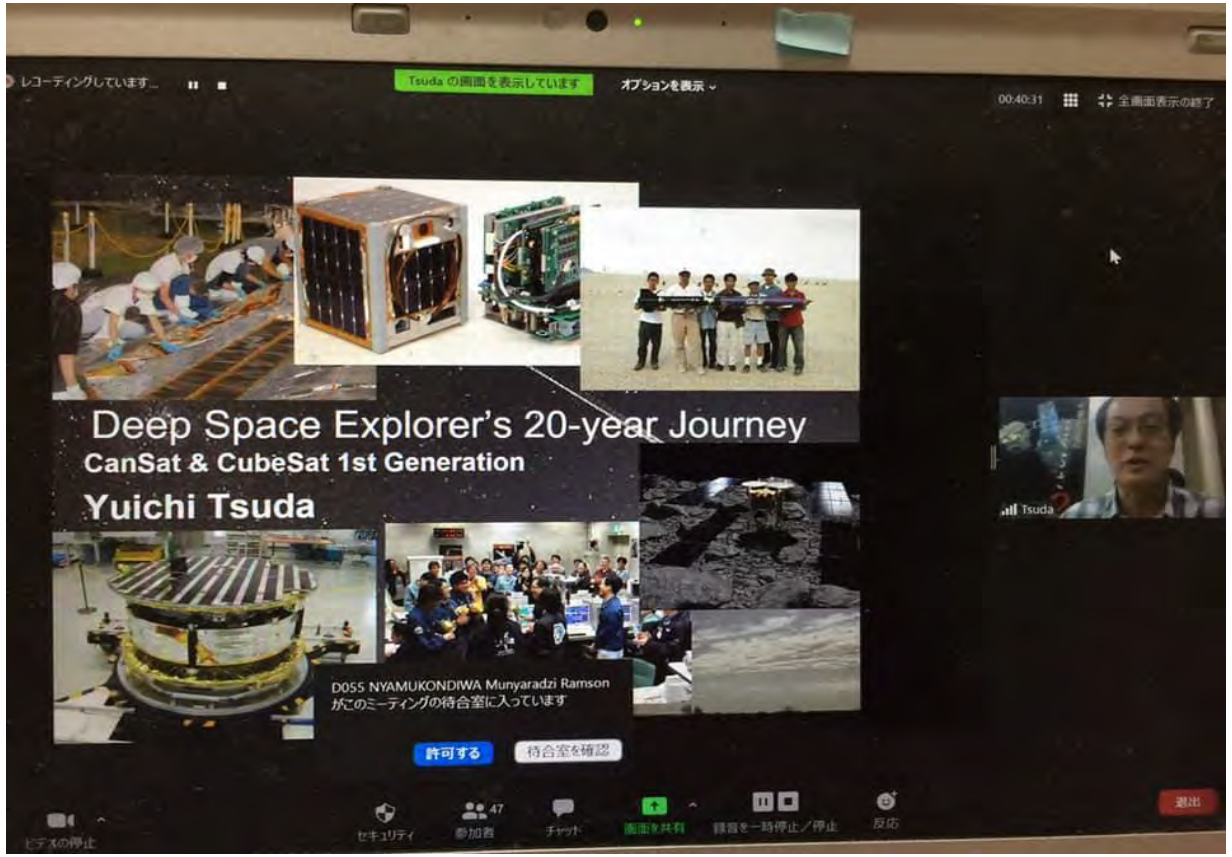
- Abhas Maskey (CLTP7, Nepal)
- Mansur Celebi (CLTP1, Turkey)
- Rei Kawashima (CLTP Producer, Japan)

Virtual CLTP Alumni Meeting,
Date: 11th July, 2020
Time:
16.00 İstanbul Time
10:00 PM Japan Time

Istanbul

Japan

Deep Space Explorer 20 year Journey



Talk by Prof. Yuichi Tsuda

Picture Courtesy of UNISEC Global

Major Highlights

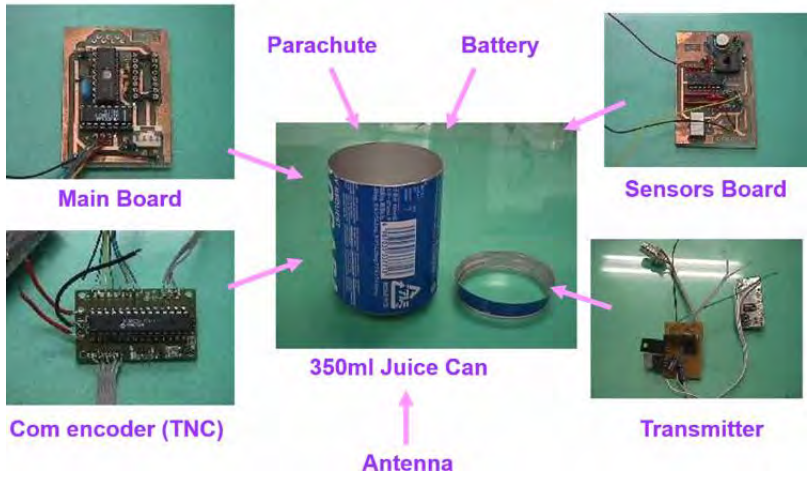
- Birth of CanSat Concept
- 1st Generation CubeSats
- Innovation that impacts and change the world
- World First CubeSat "XI-IV"
- Succes tips for Small Satellite Style
- Solar sail membrane
- CubeSat has opened up to the nano/pico satellite world
- IKAROS has opened up a new world of space exploration
- CanSat has opened up the new educational World

Deep Space Exploration

Birth of CanSat Concept

- Making a Satellite out of a Coke Can
- Idea by Prof: Bob Twiggs, Stanford University
- Three 1st generation CanSat developed by University of Tokyo
- Launched in Black Rocket Desert

Professor Tsuda 1st Work



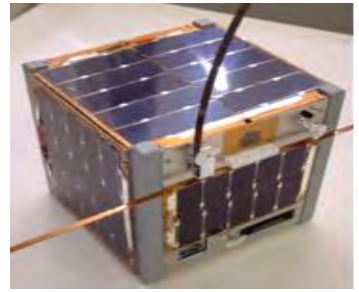
CanSat Launched in Black Rocket Desert (1999)

1st Generation CubeSats

- Proposal by Prof: Bob Twiggs, Stanford University
- Pioneered the unexplored world through the power of imagination
  - Not taught by Textbooks
  - No enough testing equipment so have to hire
  - Asked players in space the industry

Prototype

CubeSat: YEEESSSS!!!!

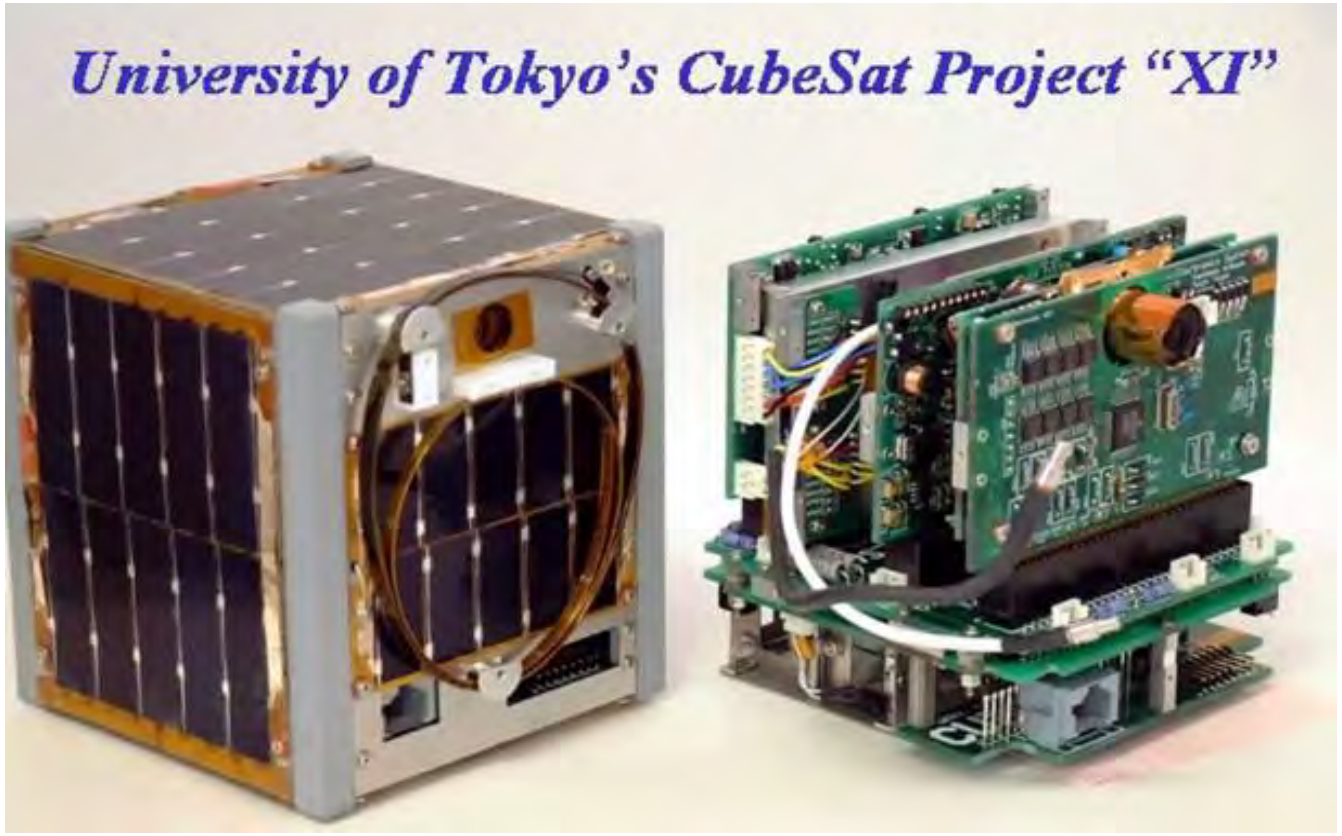


Launched 2003/06/30 at 18:15:26 JP Local Time
The CubeSat is still in Space. How come???

Innovation that impacts and change the world

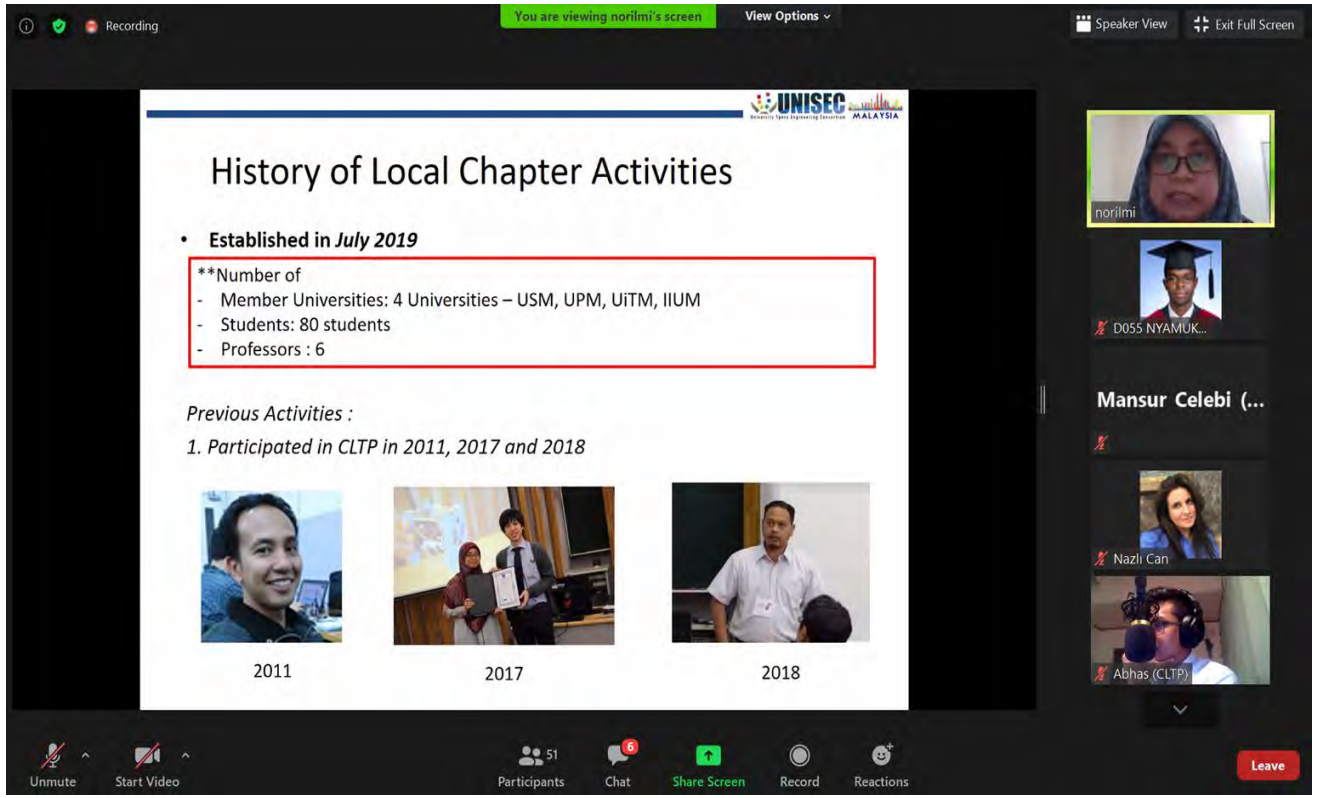
- CubeSat has opened upto the nano/pico satellite world
- IKAROS has opened up a new world of space exploration
- CanSat has opened up the new educational World

World First CubeSat “XI-IV”



From Professor Tsuda’s presentation

Regional Report: Malaysia



By Norilmi Amilia Ismail

Major highlights

- History of local chapter
- UNISEC GLOBAL Activities
- UNISEC Malaysia workshop 2020
- Workshops resolutions
- Plan for 2020 and beyond

Application of International Law for Small Satellite Activities

Atty. Nazli Can

Picture Courtesy of UNISEC Global

Major Highlights

- Laws and Treaties Governing Outers ,Moon and Celestial bodies
- Case studies on application Space Law
- Space mining

Keys lessons from the virtual meeting

❖**Innovation that impacts and change the world**

- CubeSat has opened upto the nano/pico satellite world
- IKAROS has opened up a new world of space exploration
- CanSat has opened up the new educational World

❖**Team with good visibility, quick decision**

- Keep the team compact

- **Use and pull out your ability right**
  - Create the team directly connected to things/ products
  - Clearly identify when you should/ should not challenge

❖**Quick and multiple PDCA cycle with solid engineering Management**

- To fail is the best way to learn. Many PDCA cycles provide you many “fail” opportunity- for success in the end
- Test as you fly, fly as you test is even critical for smaller, lower cost, more challenging.

❖Have an area of speciality in space engineering where you become an expert.

❖Make good friends whom you work together with and motivate each other.

Visit: http://www.unisec-global.org/guidingprinciples.html

Concluding remarks

It is important for Kyutech Students to continue participating in space meetings

- ❑ Join Space activities and be a generalist
  - ➢ CLTP
  - ➢ Attend UNISEC Global meetings
  - ➢ Be involved in practical space projects
  - ➢ Participate in competitions, workshops and training

Special Thanks to UNISEC GLOBAL for the invitation -- hope to participate in more space activities.

END OF REPORT BY RAMSON

OLAYINKA'S WORLD

COLUMN NO 19

OLAYINKA FAGBEMIRO

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

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

SCHOOLS UNDER LOCKDOWN: ASTRO ART CONTEST FOR ELEMENTARY AND HIGH SCHOOL KIDS IN NIGERIA

The Covid-19 pandemic has resulted in a prolonged lockdown on schools across Nigeria. For almost 5 months now, students at all levels have remained home as schools remain shut due to soaring infection rates. The figures stand at a staggering over 32,000 cases from barely 100 cases recorded when the lockdown was initially imposed.

Astronomers Without Borders (AWB) Nigeria has come up with an innovative way of engaging elementary and high school kids stuck at home at this period through an Astro Art Contest. This maiden Edition of the Astro Art Contest for Elementary and High School kids in Nigeria provides opportunities for kids aged 7-17 years in Nigeria to express their Imaginations of Outer Space in paintings. The call for entries opened on the 8th of July, 2020.

Promotional poster

The star prizes in this contest are SSVI homemade telescopes (Newton, refractor, two small spectroscopes) signed by the foremost Belgian Astronaut, Dirk Frimout. Other available prizes include Android Tablets, Solar glasses, Astronomy Hands on activities kits, NASA and OAD branded bags, AWB branded T-Shirts, among others.

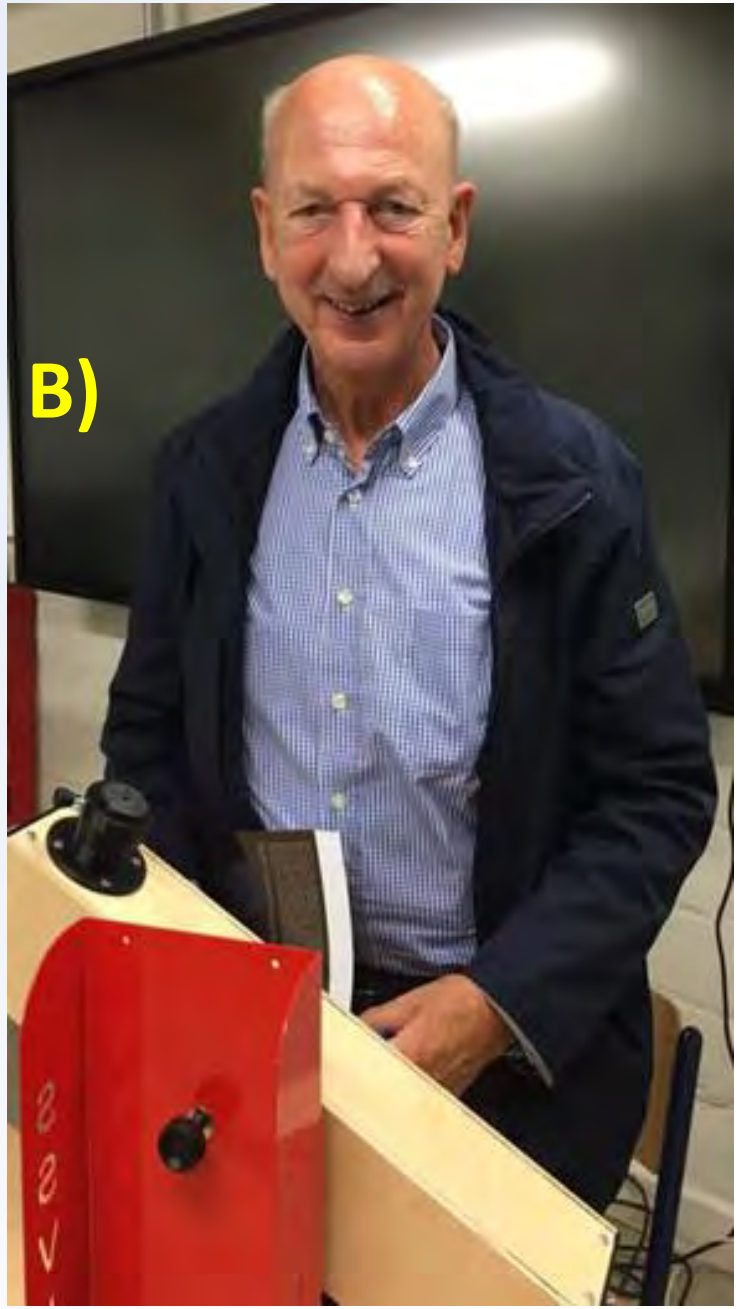
For entries submission, paintings are expected to be done on an A4 sized paper accompanied with a short write up (not more than 150 words) describing the art work to be uploaded using this link:

https://forms.gle/ukCG9rFHG3srXMM69

Entry deadline is 15th August 2020.

Contents:

END OF COLUMN #19 FROM NIGERIA



UiTMSAT COLUMN

Column No. 7

Editor: FATIMAH ZAHARAH BINTI ALI
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UiTM Sentiasa Di Hatiku
"UiTM Always in My Heart"

SPACE ACTIVITIES IN JULY BY UiTMSAT

"Activity leads to productivity", a quote from a motivational speaker, Jim Rohn, inspired my column this month. In terms of space technology, these words of wisdom indirectly imply that by performing continuous related activity, the technology will be improved or at least sustained along with the development and demands.

In July 2020, Centre for Satellite Communication (UiTMSAT) has performed two (2) significant space-related exercises in adapting and nurturing the knowledge and science of space. My column of this month will briefly elucidate the aforementioned activities.

1. 2nd International Conference on Space Weather and Satellite Application (ICeSSAT 2020)

Fig. 1: Poster of ICeSSAT 2020.

As an approach to support the government directive on the constraint of mass-gathering in order to control the spread of COVID-19 pandemic, UiTMSAT has successfully conducted a virtual conference through a video-conferencing application of Cisco Webex on 7th July 2020. This co-organized conference by Malaysian Space Agency (MYSA) was the second conference coordinated by UiTMSAT and a team from UiTM Pasir Gudang, Johor. Markedly commenced at 8.45 am (Malaysian Time), the conference began with the opening speech by the General Chair of the Conference, Associate Professor Ir. Dr. Mohamad Huzaimy Jusoh. For the record, he is also the director of the UiTMSAT.

This full day conference was divided into two sessions which were the morning session and afternoon session.

The morning session was scheduled for space weather discussion while the afternoon session was designed for satellite-category of presentation.

UiTMSAT was honoured to have Dr. Mariko Teramoto, an Assistant Professor from Department of Electrical Engineering, Kyushu Institute of Technology (KYUTECH), Japan, as the invited speaker for the morning session. Dr. Mariko Teramoto has shared her valuable knowledge on talk entitled “The Application of Space Weather Payloads on Japanese Small Satellite”. In her presentation, Dr. Mariko Teramoto has explained about the plasma instrument that will be mounted on the CubeSat-classed of Nanosatellite. The plasma instrument will be used to explore the energy and radiation patterns in the geo-space region.

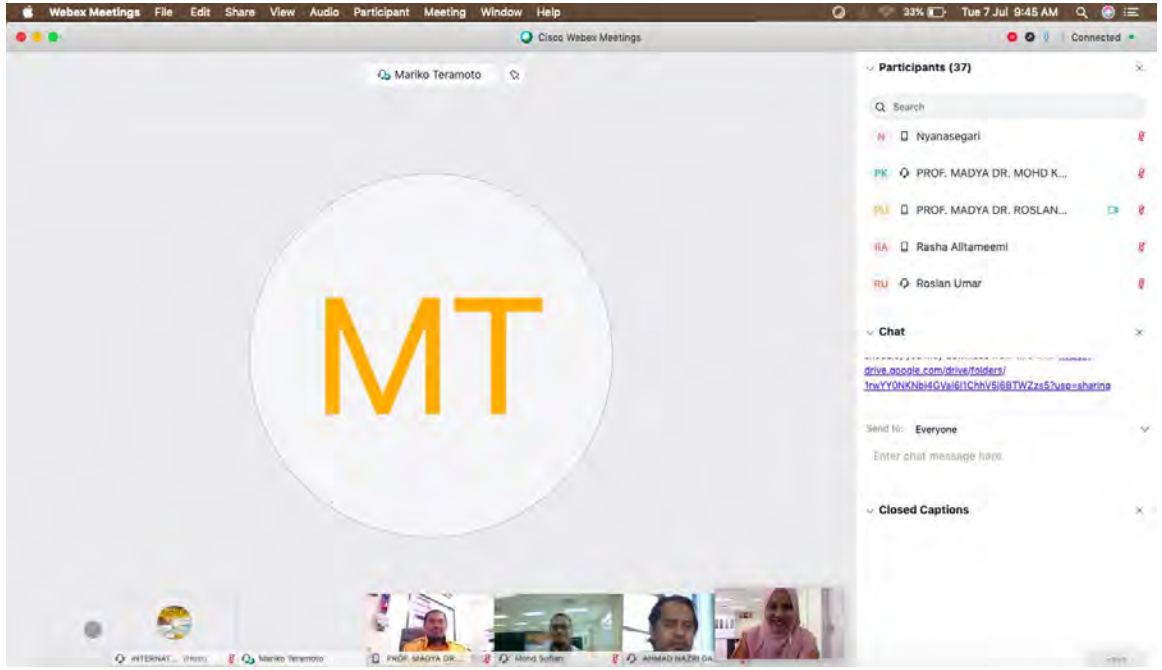

Fig. 2: A screenshot of the ongoing talk by Dr. Mariko Teramoto during the morning session of ICeSSAT 2020 through Cisco Webex application.

The morning session was continued with the presentations of the accepted papers by the participants. The presentations were actually the recorded video done and submitted by the participants. The video were played during the conference and Q&A sessions were done live after each video ended.

In the next session of ICeSSAT 2020, which started at 2 pm (Malaysian Time), second speaker which was Associate Professor Dr. Nafizah Goriman Khan, gave a talk entitled “Current Trends in Global Space Technologies”. Dr Nafizah is a lecturer from University of Nottingham (Malaysia Campus). She has exposed the participants to the global trends in the space technologies that were actually new information and impressing. As this session was scheduled for satellite-related category, the presentations of the accepted papers were continued after the keynote speech ended. There were 18 papers accepted in total for the conference.

The conference was formally ended at 5 pm (Malaysian Time) with the closing speech by the representative of Director General (DG) of MYSA, Mrs Zahira Mod Radzi, the Division Manager of the Space Exploration & Science.

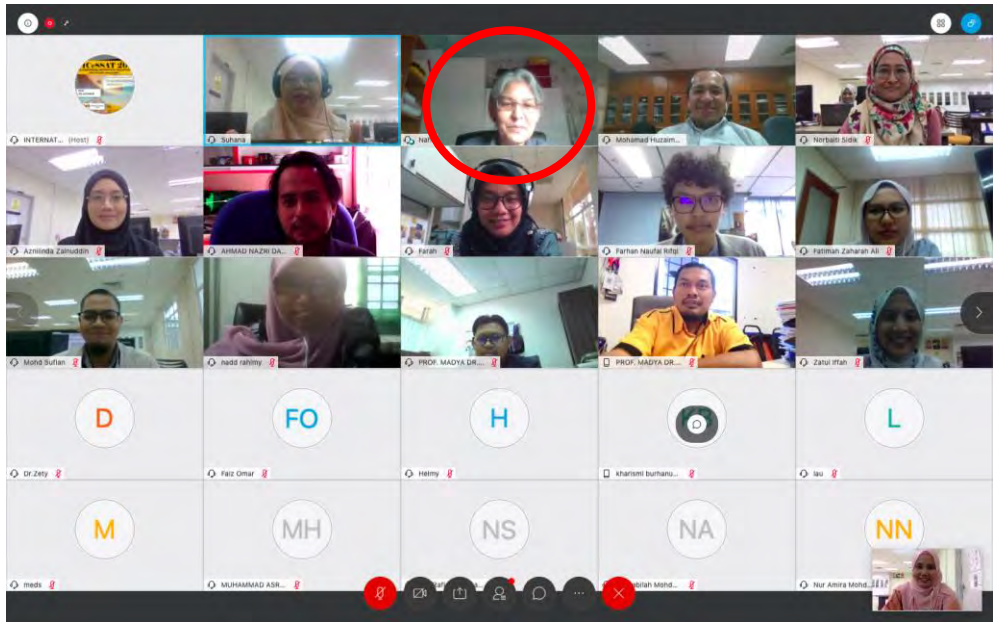

Fig. 3: A screenshot of the afternoon session. Dr Nafizah is highlighted in the red circle.

2. Discussion to Prepare the Draft of the Bill of Law for Space Technology in Malaysia

UiTMSAT was invited by the representative of the Division of Policy Planning and Research from Ministry of Higher Learning to be involved in a meeting to discuss about the draft of the bill of law for the space technology. UiTMSAT was one of the invited stakeholders for the meeting. The meeting was held on 7th July 2020 at MYSA in Kuala Lumpur.

The meeting was organized and chaired by the representative of MYSA. The agenda was to discuss about the bill of law that is deemed appropriate and suitable for the space advance in Malaysia while amending and improving the existing law in order to correlate with the technology as well as the current and future demands.

UiTM was invited as the institute of higher learning which has been involved and experienced in space field to provide related inputs to the meeting. Other stakeholders who were specially invited by MYSA were Ministry of Science, Technology And Innovation (MOSTI), Ministry of Home Affairs, Civil Aviation Authority of Malaysia (CAAM), and more.

Fig. 4: The meeting to discuss the bill of law for Malaysia space technology was in progress.

END OF COLUMN #7 FROM MALAYSIA

STAMINA SPACE

UPDATES FROM THE PHILIPPINES

July 15, 2020

University of the Philippines-Diliman
Quezon City, Philippines

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Maya-1's 2nd Launch Anniversary

June 29, 2020

The Maya-1 cube satellite (CubeSat) was launched from Cape Canaveral, Florida, on board a Falcon 9 rocket. The rocket was headed to the International Space Station as part of a SpaceX CRS-15 commercial resupply service mission.

JCI Manila 5th General Membership Meeting

July 10, 2020

The Manila chapter of the Junior Chamber International (JCI) invited Dr. Joel Joseph Marciano, Jr. to talk about the Philippine Space Agency (PhilSA). Dr. Marciano was appointed to head PhilSA as its Director-General. Dr. Marciano's presentation was entitled *"Our Place in Space: Philippine Space S&T and Applications Highlights"*.

The theme for the event was "Filipino Winners: Habits & Mental Attitudes of World Class Pinoys".

Photos from the JCI 5th GMM Online Webinar

Science Communication

June 27, 2020

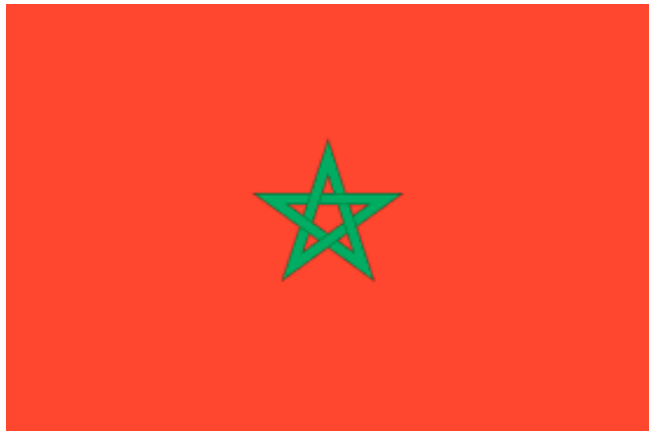
Engr. Leur Labrador, a member of STAMINA4Space Project 2: PHL-50, was invited by Nepal's ORION Space to present about the development of Diwata-1 for some undergraduate engineering students.

Learn more about Orion Space: http://orionspace.com.np/

END OF REPORT FROM THE PHILIPPINES

Space Activities of Morocco

by MOUMNI Fahd
SEIC student from Morocco
14 July 2020

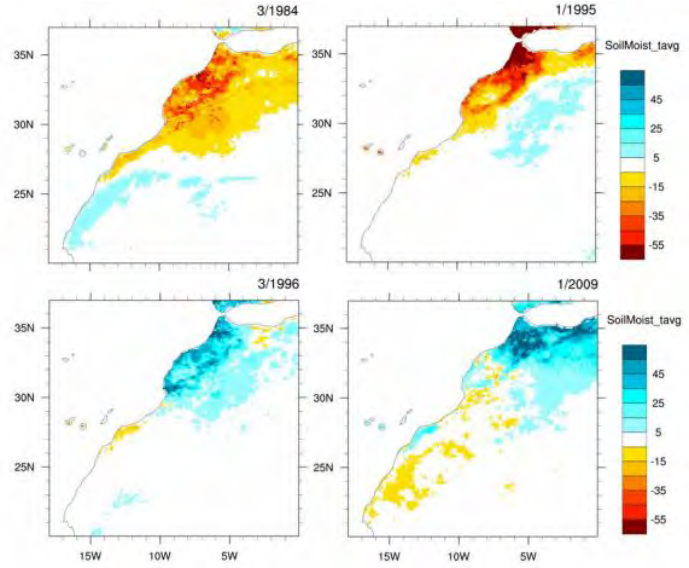


Space in Morocco

- It all started with the first University ever in the world (still operational to this day) : University “Al Qarawiyine” founded in 859 AD by Fatima Al Fihri, the daughter of a wealthy merchant, in the city of Fes, where astronomy, math, and other subjects were taught. Notable names of scientists were carved in Morocco’s history in astronomy, such as Al Zarqali (11th century) and Al Marrakushi (13th century).
- The real entrance of the country in the space industry was through the establishment of its “spatial agency”, the Royal Center for Remote Sensing (CRTS) under the Ministry of Defense, founded in December 1989 at Rabat, the Capital City. A Royal Center for Space Research and Study (CRERS) was later created after the launch of the first satellite in 2001.
- CRTS missions mostly focus on Remote Sensing and GIS (Geographic Information System) to respond to natural resources needs, environment protection, land management, and to build capacity in earth observation developing it in the country while also raising awareness among other institutions, the general public, and students.

Al Qarawiyine University from inside

CRTS Logo



An example of application : monitoring Morocco’s soil moisture anomalies

Main sources for this report :

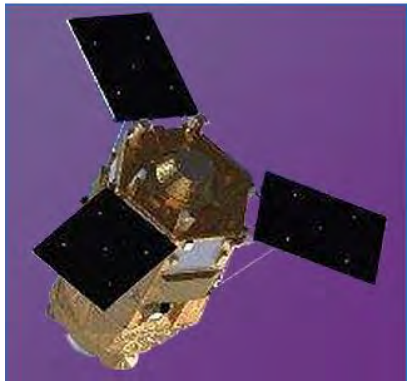
https://www.unoosa.org/documents/pdf/hlf/1st_hlf_Dubai/Presentations/41.pdf

https://www.unoosa.org/documents/pdf/hlf/HLF2017/presentations/Day1/Session_2/Presentation8.pdf

Moroccan Satellites

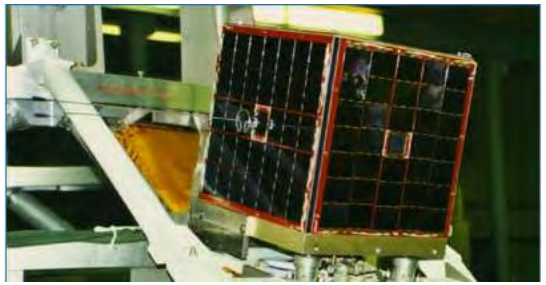
- In total, Morocco has already launched 6 satellites : 2 micro/small satellites, 2 nanosatellites and 2 governmental satellites.
- The first project may remind of BIRDS projects : MAROC-TUBSAT (or “Zarkae Al Yamama”) joined both the Institute of Aeronautics and Astronautics in the Technical University of Berlin in Germany (in charge of the satellite bus) and the CRTS from Morocco (payload + launch). The aim was vegetation detection in a remote sensing mission while forming Moroccan engineers. Launched in 2001, the mission lasted more than 2 years.
- Mohammed VI-A & B were launched respectively on November 2017 and November 2018 with Arianespace launcher (France) as the first governmental satellites of Morocco, used for mapping, land surveillance and other missions of the CRTS. The satellites were developed by Airbus Defense and Space, and they are supposed to assure 5-year missions.
- August 2018, the first smallsatellite in the world to study the Ozone layer and the thermic emissions, was launched from Mexico, fruit of a collaboration between the “ENSIAS” students of Rabat, a British launcher, and a Mexican startup, using the IoT (Internet Objects Technology) for a total duration of 5 months.
- 2 first nationally-made nanosatellites (1 from Fes University and 1 from the ENSIAS) were developed with the Center of Space Research in Poland (country of launch), a University in India, and the same British launcher as before, for the purpose of climate change monitoring on top of the Mediterranean Sea. The 1U-cubesats were sent to space on the 31st of July 2019.

Professor Mohamed Karim (Fes) and his students with the cubesat structure



Mohammed VI-A satellite

British capsule containing the moroccan smallsatellite



The first moroccan satellite (47kg) : Maroc-Tubsat / Zarkae Al Yamama

Space Law in Morocco

- Even if the first institution was created later on, Morocco was one of the early members of the UN COPUOS (since 1961), then actively taking part in the international committee since 1992.
- Morocco has no national space law but yet, it has already ratified the 5 main UN treaties about space : The outer space treaty, the rescue agreement, the liability convention, the registration convention, and the moon agreement.
- Eventually, Morocco acts towards the promotion of Space by organizing workshops and conferences with many partners such as : ESA-ECSL, CNES, DLR, and others. The country also implements the Space Law aspect in Universities and informative gatherings.

No sovereignty is allowed in space, therefore laws had to be established

The outer space treaty already celebrated its 50th anniversary in 2017: it is considered as the « backbone » of space law

Projects, Cooperation and Education

- Morocco's involvement is appearing through the many projects made with different countries and agencies, but also through the actions according to some of COPUOS Sustainable Development Goals (SDG such as Responsible Consumption and Production-SDG12, and Climate Action-SDG13).
- The North-African land does not hesitate to call for various cooperations, expanding its network and enhancing its space sector at the same time. A nice example would be the LDAS-Morocco project (Towards Improving Water Resources Management and Adaptation to Climate Changes) in which NASA, The World Bank, The Technical University of Wien in Austria, The USAID, and other Moroccan, US, and Dutch universities took part (providing a variety of experts on an international scale).
- COP22 (UN Conference Of Parties) occurred in Marrakech in 2016, hosting heads of Space Agencies discussing about "Space Technology helping to implement COP Agreements".
- GLEC2019 (Global Conference on Space for Emerging Countries) by IAF (International Astronautical Federation) also took place in Marrakech, for the promotion of the space field in Africa and its potential-hidden countries.
- Education and Capacity Building is seen on space related classes given in Universties which already resulted in helping NASA discovering and identifying 3 exoplanets "that may be habitable" (TRAPPIST-North Telescope from Oukaimeden Observatory by 25-year-old PhD student Khalid Barkaoui). In addition, infrastructures are made to train international users through annual programs, mostly on remote sensing and GIS (already 2000 people participated to the programs).
- Regional Centers in Morocco can offer 3 graduate Masters : RS&SIG, Satellite Meteorology and Satellite Navigation (more than 300 graduates to this day).

El Barkaoui in front of the telescope from which he discovered the exoplanets (TRAPPIST-North located in Morocco).

Main poster of the GLEC 2019

Space Technics training for representatives of the UNDP-Africa (Oct. 2017, CRTS Morocco)

What to work on ? (subjective)

- During this 30-year journey, Morocco made itself one of the main Space pioneers in Africa (if it is not the most prolific) : it still needs to form engineers, to diversify its activities, and while keeping contact and partnerships with the notorious countries in the field, it should become autonomous enough to assure complete projects from the idea to the launch.
- South-south cooperation with African countries is to be encouraged as common-goal projects can be found easily on the same continent.
- For now, students and youth's interest is more and more targeted by the organization of meetings with worldwide professionals and VIPs, for instance by "Moonshot workshops" such as the one that occurred in Rabat, organized with the US Embassy in Morocco, and celebrating 50 years of the Apollo 11 mission on the 21st of July 2019 at the "ENIM" engineering school : A conference was given by former NASA Engineer Dr. Ayanna Howard, and former NASA Space Camp Moroccan students were present at this event.
- Another Example is that of Moroccan Engineers playing the role of models and inspiring many generations, for instance, Mr. Kamal El Oudrhiri, engineering at NASA's JPL, and the current project manager of the Cold Atom Laboratory (CAL) implemented in the ISS, was awarded NASA's prestigious Medal for Outstanding Service and spoke about it in Casablanca on November 2019 on a "Moonshot Morocco" event.

Written by MOUMNI Fahd

END OF REPORT FROM MOROCCO

Moonshot Morocco Logo

ENIM Students competing with their small-lunar rovers in front of Dr.Howard

Thematic decorations for the event

Dr. Ayanna Howard and I, after a quick discussion.

Mr. Kamal El Oudrhiri from the Jet Propulsion Laboratory.

BIRDS-5

Kick Off Meeting of 14 July 2020

4:30 – 5:30 PM

with Uganda team and JAXA-ISAS team participating remotely

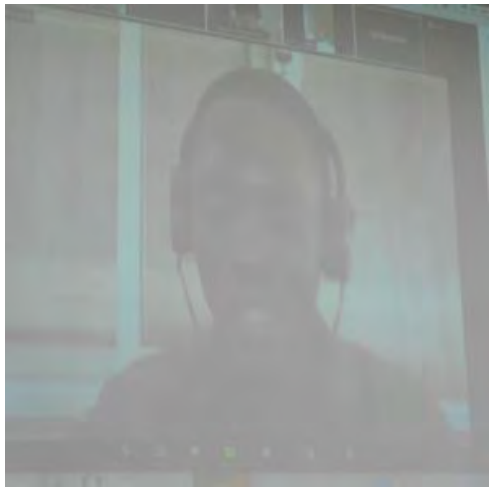
We used this Tobata Campus facility

Getting ready

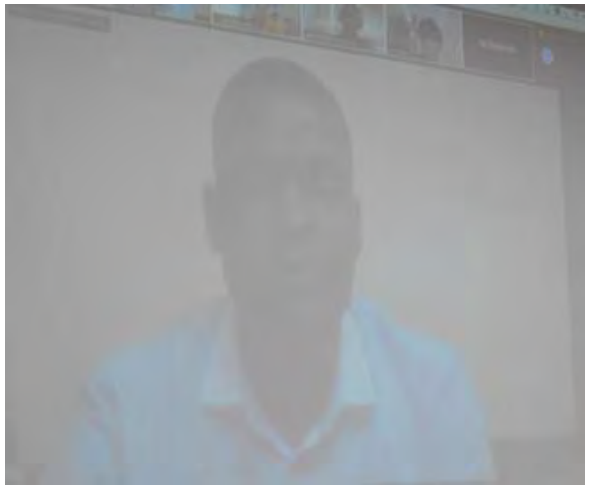
Ramson of Zimbabwe

Social distancing is well observed

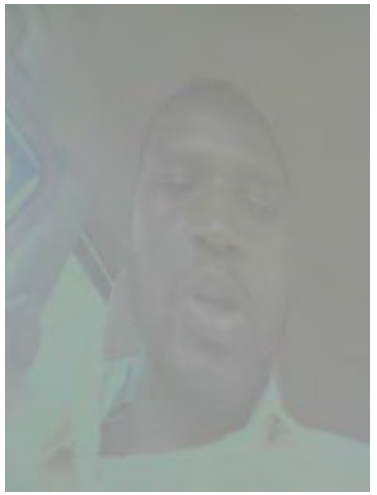
Each project member did a short introduction, in person or remotely



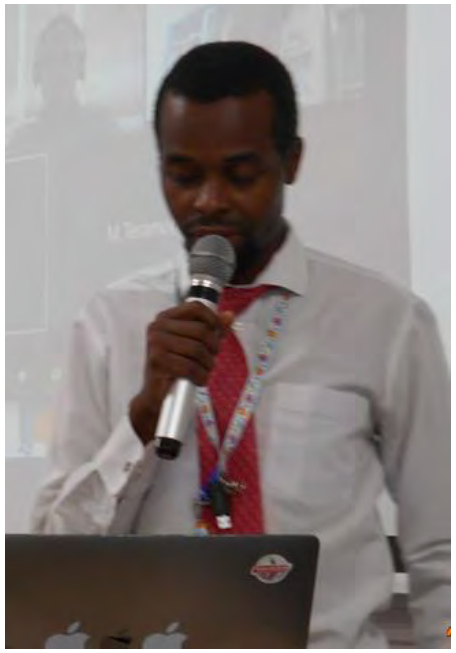
Derrick



Edgar



Bonny



Ramson

Fahd

Keenan

Otani

Nakai

Timothy

Oshiro

Kamitani

Victor

Hind

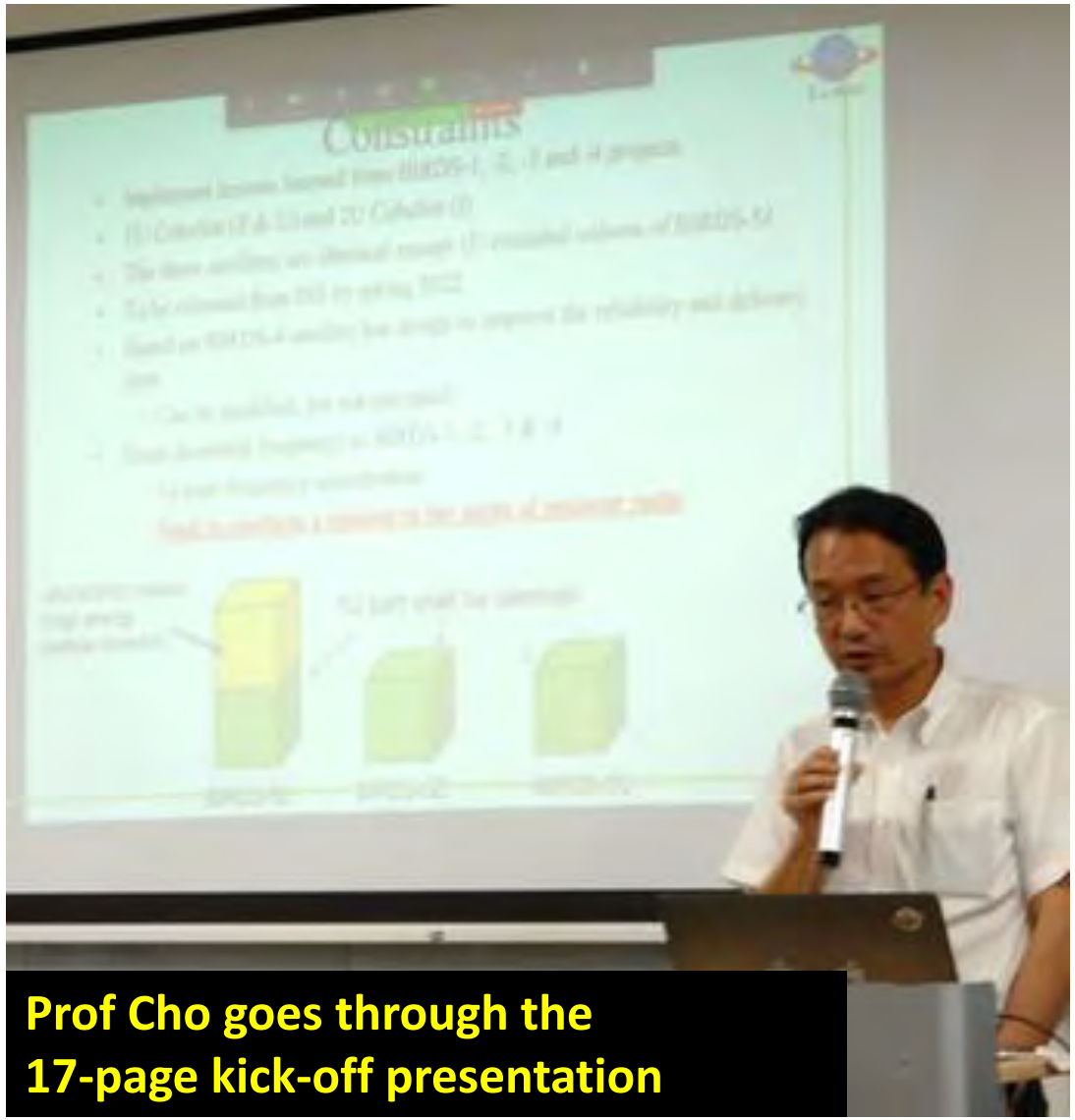
Dr. Kim

Dr. Yamauchi

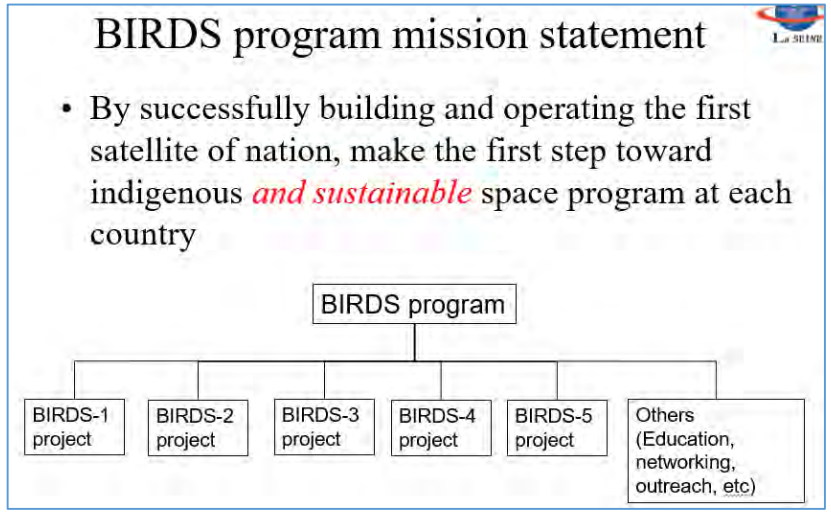
Dr. Teramoto

End of Self Introductions

All photos were taken by G. Maeda during the meeting



Prof Cho goes through the 17-page kick-off presentation



THE TEN RULES OF OUR PROJECT

1. **No Excuse**
2. **Be on time**
3. **Respect others**
4. Be responsible
5. Watch schedule
6. Act as a team player
7. Have a long view
8. Be clean
9. Work hard
10. Have fun

DOWNLOAD THE KICK-OFF PRESENTATION BY PROFESSOR CHO:

https://www.dropbox.com/s/7dvaugrw47dax8t/14-07-2020%3B%20BIRDS-5_kickoff_presentation.pdf?dl=0

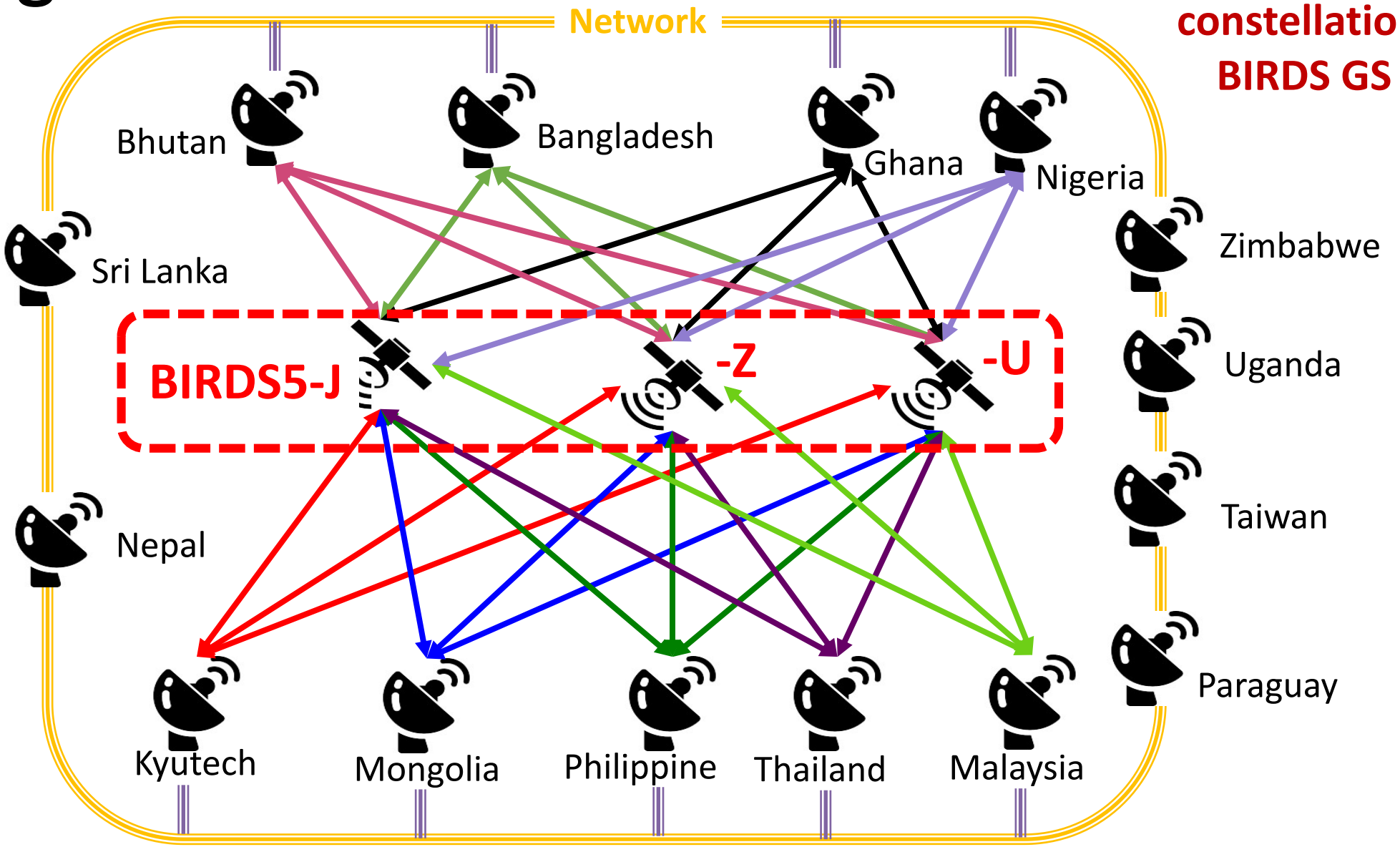
Objectives of the BIRDS-5 Project

- Learn the entire processes of a satellite program from mission planning to satellite disposal
- Lay down foundation of sustainable space program by accumulating human resource in universities and launching a university space research and education program
- Create international human networks to assist the infant space programs of each other

BIRDS ground station network

The sun never sets on it

Operate the BIRDS-5 constellation via the BIRDS GS network

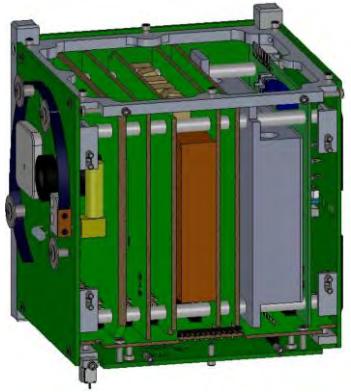


This page was edited by G. Maeda

Milestones ahead

- End of July
  - Team formation. Everybody knows each other
- Middle of August
  - Missions fixed
- End of August
  - Understand how each mission is carried out
- End of September
  - Mission definition review
    - Satellite proposal draft
    - Feasibility of each mission. If not, items to be worked
  - Preliminary Design α
    - Everybody can visualize how the satellites look like
    - Components/parts selection
  - Enough material to start working on JAXA launch contract and amateur radio frequency coordination

This kind of picture by the end of September



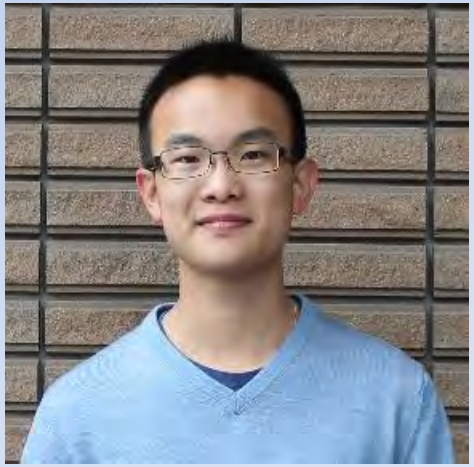
Conclusion of the BIRDS-5 Kick-Off Meeting

of 14 July 2020
-- other participants are visible on the screen in the rear

BIRDS-4 Reports
are on the following pages

GRSS = Geoscience and Remote Sensing Society

GRSS Cloud Classification Software



Timothy Ivan Leong

July 7, 2020

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

GRSS Cloud Classification Software

The software that is being developed for the IEEE Geoscience and Remote Sensing Society by the ICU team stem from the same concept than the ICU mission that was developed for BIRDS 4, i.e. automatic satellite recognition. However, the common point stop here as the new software is more ambitious for the new GRSS cube satellite.

Since the new cube satellite will be 3U, it will be implemented with attitude control that will allow it to have the camera always facing downward. Thus the new software will now detect clouds in the picture instead of just detecting whether the camera is pointing toward space, earth or has taken a blurry picture. This change in scope has forced the ICU team to completely rebuild the algorithm from the ground up and change the machine learning model it is based on.

The new algorithm uses Convolutional Neural Network (CNN) to detect clouds in an image. More particularly it utilizes a variant called U-net (name given based on the U shape this model is often represented as).

CNN is a type of machine learning model that is in the particular subfield called deep learning.

Deep learning is, according to the book « Deep learning with Python » by François Chollet, "a specific subfield of machine learning: a new take on learning representations from data that puts an emphasis on learning successive layers of increasingly meaningful representations."

This subfield of machine learning is currently the most promising field that can potentially give very good result more easily than other field. For detecting cloud, it is also easier to use CNN compared to SVM which was used in the previous ICU mission

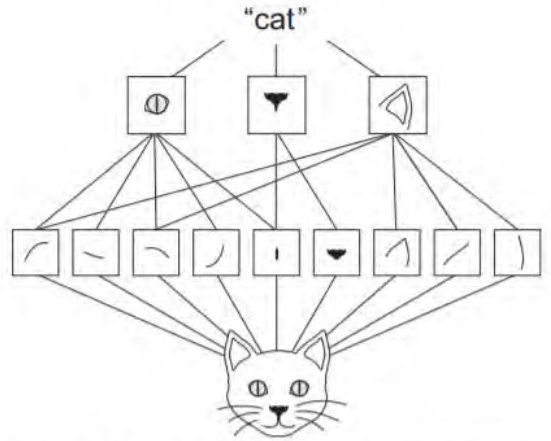


Figure 5.2 The visual world forms a spatial hierarchy of visual modules: hyperlocal edges combine into local objects such as eyes or ears, which combine into high-level concepts such as "cat."

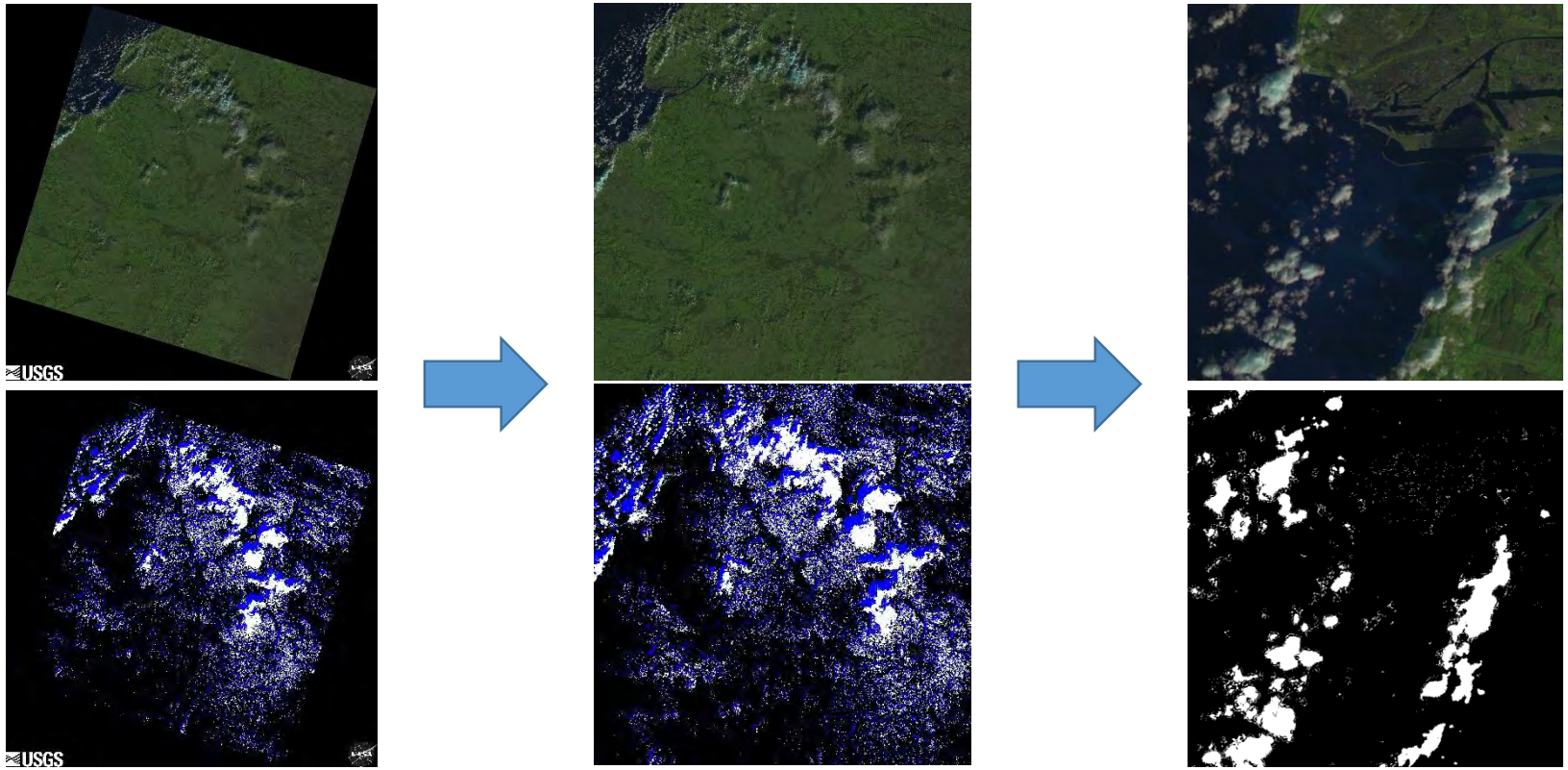
Basic illustration of how a CNN works

GRSS Cloud Classification Software

In order to develop this software, a dataset had to be created to train this model. Images were taken from the USGS Landsat 8 public database. The images were taken from various places in the world to assure that the system would be able to generalize well. They are advantageous to use in our case as the images are provided with a mask of cloud we can use to train our model with.

They had to be processed as the Landsat 8 dataset gives its images tilted so that the upper side of the image points toward the North. Also, the images are very large and had to be sliced in several smaller images so that we could feed it to our machine learning algorithm.

In the end the dataset contains ~8500 images with 7600 used as training images and 900 as validation images



Processing a Landsat 8 image

GRSS Cloud Classification Software

The Convolutional Neural Network we are training is based on U-net. It consist of an encoding and a decoding part which first detect the feature in the images then places them spatially to give us a mask of clouds.

After training the model gives us around 93% accuracy with most images. However as can be seen in the results we are getting, some images are still hard for the model to distinguish the clouds if the contrast between the background and the clouds is not big enough.

Current work is focused on reducing the number of these edge cases (by increasing the number of images in the dataset and modifying the parameters of the neural network) and trying to implement a first model inside a microcontroller for testing on real hardware.

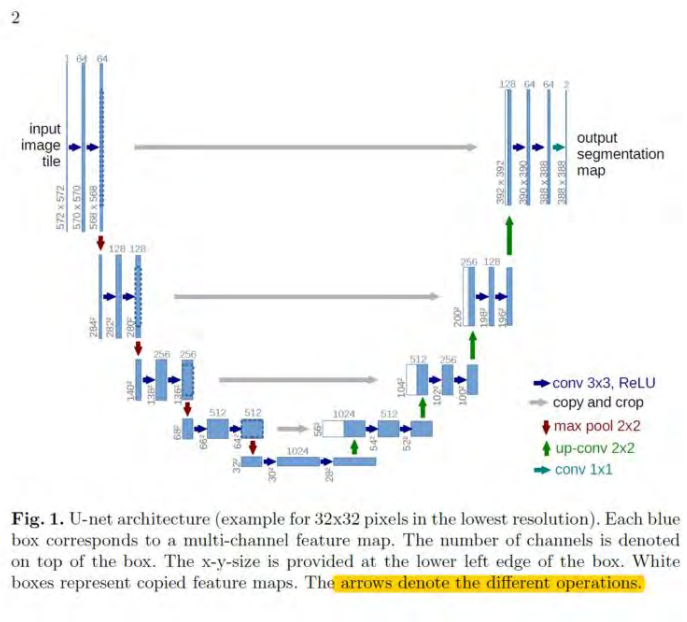
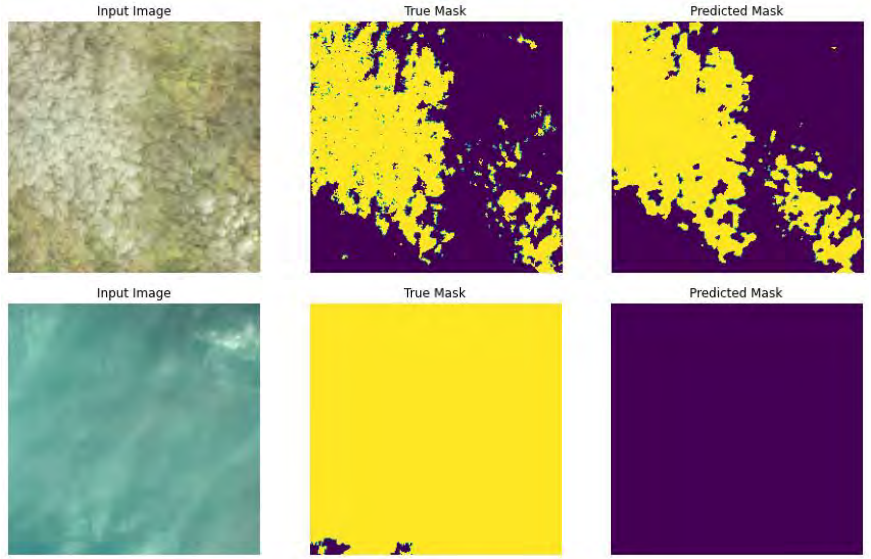


Fig. 1. U-net architecture (example for 32x32 pixels in the lowest resolution). Each blue box corresponds to a multi-channel feature map. The number of channels is denoted on top of the box. The x-y-size is provided at the lower left edge of the box. White boxes represent copied feature maps. The arrows denote the different operations.

Source: « U-Net: Convolutional Networks for Biomedical Image Segmentation »



Current Results

Planting in Space

Yasir M. O. ABBAS

July 7, 2020

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Planting in Space

Written By: Yasir ABBAS

Many scientists think that humanity's future is up there in the stars. Earth might not be the only planet where humankind lives. The efforts to find an inhabitable planet have been undertaken for quite a long time now. However, no place with all the supporting elements for a living is found yet.

one of the main factors is the food supply for the colonies that might live on another planet. While the search is going to find a place where the environment is similar to Earth. Scientists are also thinking of overcoming this challenge by developing agriculture methods that are viable to be used in both the current reachable places (i.e. The Moon, Mars, and even in the ISS) and during the journey to these places.

Growth test of crops in ISS [Link]

To create food scientists are trying to simulate the space and low gravity environments by doing microgravity researches. They perform experiments with different lighting and temperatures to see which environment is best for growing plants.

The main challenges are the lack of the right gravity and radiation.

The first g the first plants to flower and produce seeds in space ware dated back on 1983 in the Soviet Salyut 7 space station. Now more than 25 plants were successfully grown in the space.

In January 2019, the first experiment to grow in the Moon was conducted.

Nowadays, space agencies hope to grow plants with as little soil as possible by suggesting innovative ideas such as growing in misty air or delivering the water directly to the roots of the plant.

Zinnia plant in bloom in ISS
[Link]

MVA-Participation of Emerging Space Countries (PESC)

Hoda El-Megharbel

July 8, 2020

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

MVA-Participation of Emerging Space Countries (PESC)

Written By: Hoda Awny El-Megharbel

Moon Village Associations (MVA) objective is to represent and participate in the public community discussing space exploration and especially Lunar exploration and missions.

MVA initiated this project for the space enthusiasts from countries with no plans for missions related to lunar exploration, to help them to discover what opportunities the Moon Village Association can offer for their country.

The main goal of this project is to create a sustainable international informal gathering for governments, industry, academia, and the public especially from developing and non-space faring countries interested in the development of a concept of Moon Village.

The project is mainly consisting of two parts: PESC event and road map.

PESC event: selected teams will exclusively attend an online workshop as an introduction to the program and connect each team with an expert from MVA to guide the team through the second part of the project.

Road map: participants from each team will work closely in brainstorming and organization of tasks to develop a roadmap that can represent their country's main capabilities and interests in a Moon Village.

For further details about the project status and timeline, please check the MVA official website.

Reference: moonvillageassociation.org

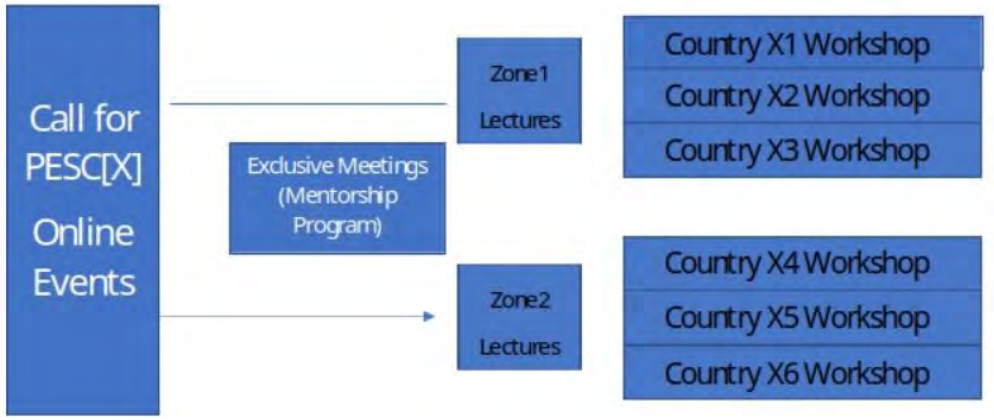


Figure 1: Online PESC Structure MVA©

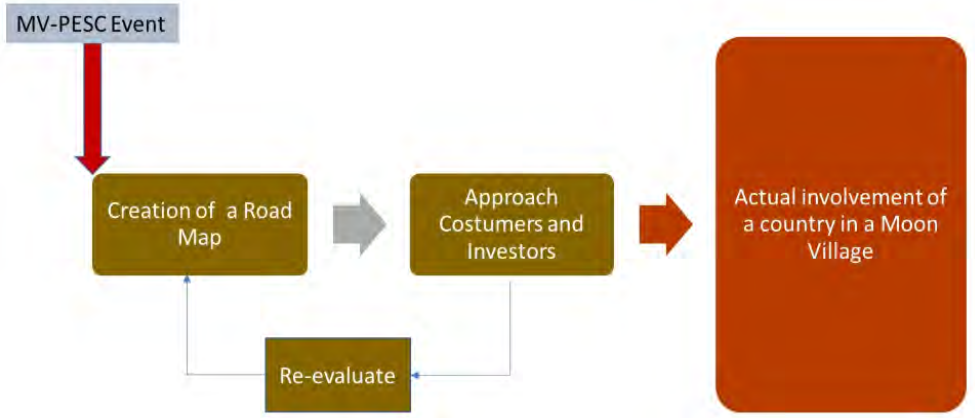


Figure 2: Moon Village PESC Activities © MVA

Solar Panels' Power Generation Testing Method

Hari Ram Shrestha

July 8, 2020

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

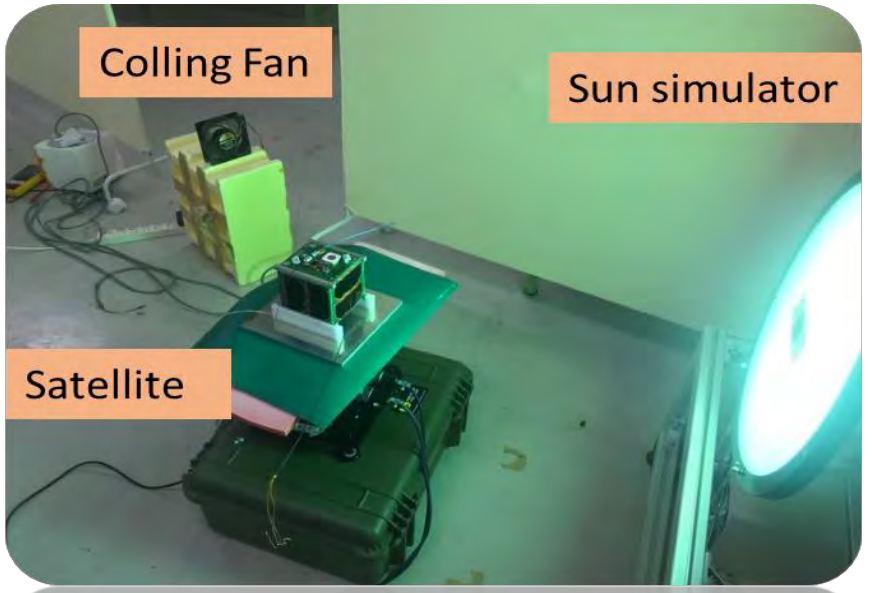
Introduction

Written By: Hari Ram SHRESTHA

In CubeSat, the Electrical Power system (EPS) is a subsystem having the following functions: 1) To provide uninterrupted reliable continually power to satellites' payloads and to all the subsystems during the whole orbit life. 2) To convert solar energy to electrical power which means they generate electrical power of the satellite.

For BIRDS-4 Project, The solar panel is mounted to the five sides for power generation in the orbit for charging the secondary battery and providing the energy to the subsystems during the day period.

In my previous article at BIRDS Project Newsletter – No. 48, Page(77-79) [Link] I had written about the functionality test, in the cleanroom, of solar panel's output by using the sun simulator and had shown some steps on how to do this functional test work. At this time, Only I mention about the how we have been doing the test during these days and showing whether the mounted solar panel's output is fully generating or not with sun simulator Moreover, we (Hari and IZ) are doing this test for all satellites by monitoring the data from FAB. We received these data in the hex format by SIOW.



Experimental setup

For this test Method, We have require some equipment and software.

Items needed are:

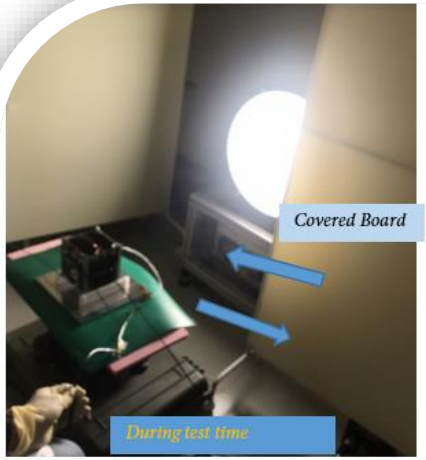
1. CubeSat
2. Rotator with its software
3. Laptop
4. Multi-meter
5. Cooling Fan

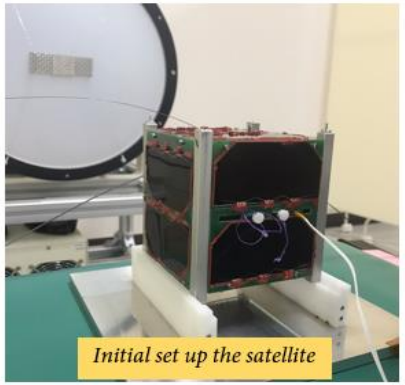
During test

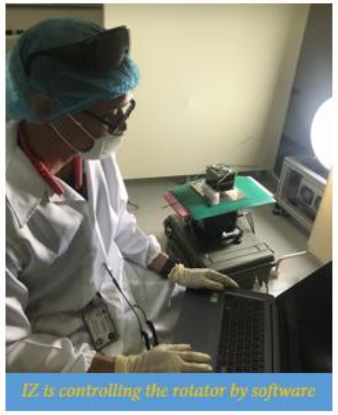
Written By: Hari Ram SHRESTHA

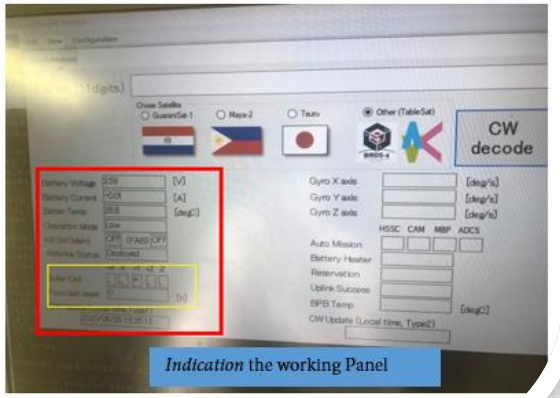
Preparing the required equipment for the test

This test is still in the progress, when it is completed with getting proper data, I will update it and write again on getting computational data of BIRDS-4 CubeSat Solar Panel output.

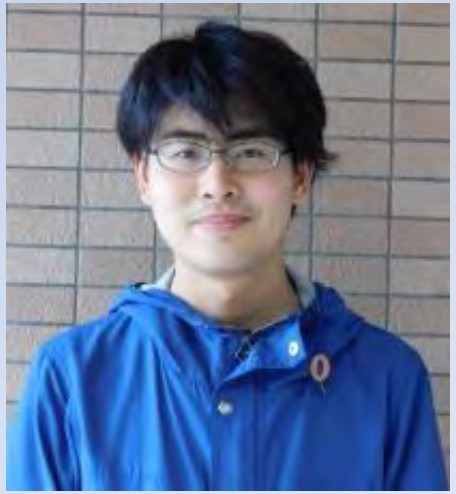








Domestic License Application for Utilizing Amateur Radio



Daisuke Nakayama

July 7, 2020

Domestic License Application

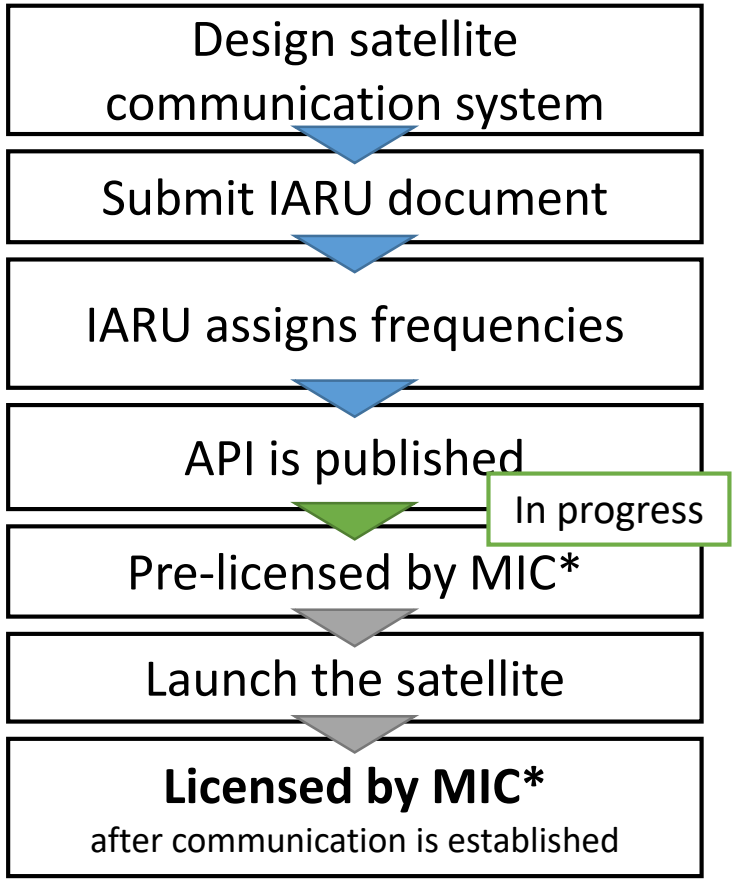
Written by: Daisuke Nakayama

BIRDS-4 license-related issues have advanced to domestic license issuance because ITU published our API. We had to prepare these documents for the domestic license :

- *Satellite experiment plan*
- *Satellite station / ground station application form*
- *Satellite station / ground station radio station statement*
- *Satellite station / ground station construction plan*

We need to not only open new satellite stations but also rewrite our ground station license about communication partner. We submitted these documents to Japanese government. After they check the documents, the government officer will come to Kyutech, check the ground station equipment and satellite communication boards and issue the satellite temporary licenses. Once we have the temporary license, we will be able to hand over the satellite to JAXA and have it launched.

After BIRDS-4 satellites is launched, the government officer will come to Kyutech again. They will check that the communication is established and issue the actual satellite amateur radio licenses. The reason why it is divided into two inspections is that the installation location of the satellite stations are on orbit as a designated item, and this license cannot be issued until it put on orbit. There is still a long way to go.



Flow chart of frequency coordination for amateur radio satellite

MIC : Ministry of Internal Affairs and Communications (Japanese ministry for communication)

FM Vibration Test

Yuma Nozaki

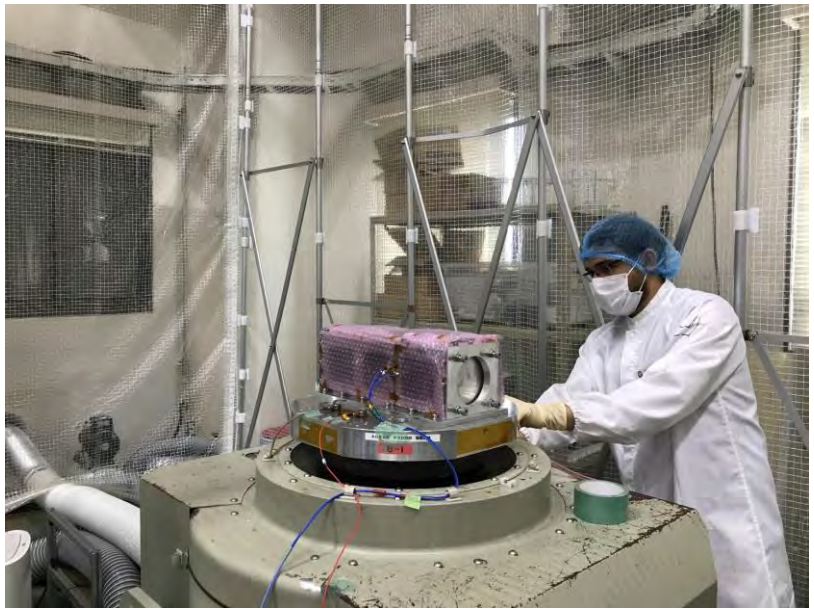
July 9, 2020

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

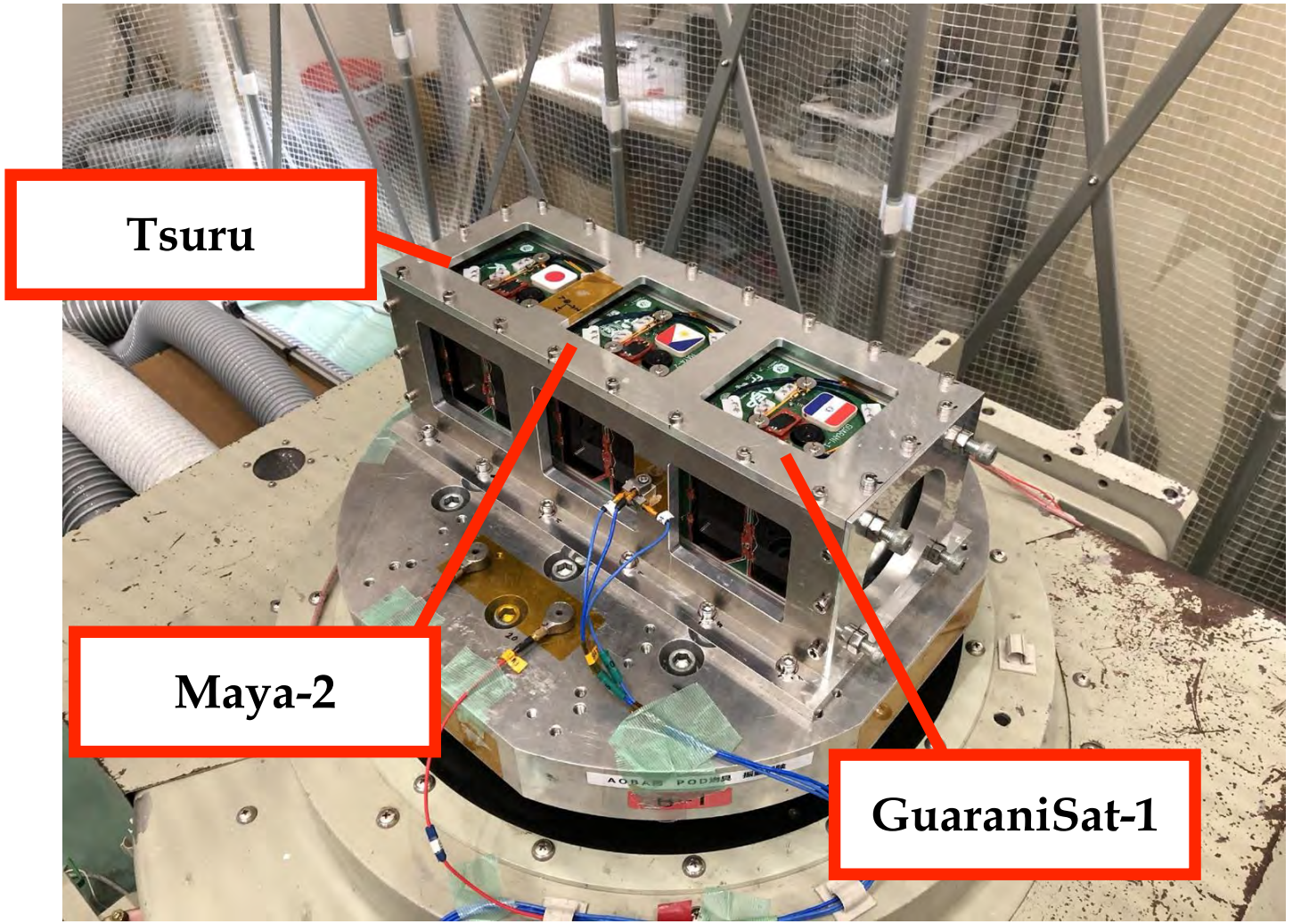
FM Vibration Test

Written by: Yuma Nozaki

We did vibration test of FM on June 12. The purpose of this test is to make sure the FM satellites can survive the launching environment. As a result, the FM satellites passed this vibration test. We paid attention to Coronavirus and maintained social distancing during the vibration test.



Yigit is setting up the vibration test



A picture of BIRDS-4 FM satellites in the POD

End of this **BIRDS Project Newsletter**

(ISSN 2433-8818)

Issue Number Fifty-Four

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.