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.*

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BIRDS Project Newsletter

Issue No. 46
(20 Nov. 2019)

Edited by:
G. Maeda
Laboratory of Spacecraft Environment Interaction Engineering (LaSEINE),
Kyushu Institute of Technology (Kyutech)
Kitakyushu, Japan

La SEINE

SEIC Space Engineering International Course

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

Table of Sections

Continued on the next page

From Philippines

The Guest Box

Kalanggaman Island lies only 18 kilometers (10 nautical miles) from Capitancillo Islet, heading 233° on a compass. We recommend an island tour package where you go to Capitancillo Island first. From there, Kalanggaman Island is only 30-40 minutes away. Uninhabited Kalanggaman Island has the look and feel of a tropical island paradise.

CONT'D ON THE NEXT PAGE

Table of Sections [continued]

END

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.

"The Guest box" CONT'D

Part of Palompon, Leyte, the 750-meter (2,500-foot) Kalanggaman Island was "discovered" only a few years ago. Photos circulated the Internet, and island tours soon began. Cebu and Leyte are barely visible in the distance.

The local word "langgam" means "bird." The island's name, Kalanggaman, represents that the island looks like a bird in flight. In fact, a time-lapse video from the air might show the illusion of flight. This is because, like Sumilon Island, Kalanggaman Island's sandbar moves around. It moves throughout the year, and it moves from year to year. Its future position is unpredictable.

Source and Photo Credit: https://www.divescotty.com/island-tours/kalanggaman-island.php

Watch: https://www.youtube.com/watch?v=t8N_Z-MNCdQ

-- by Mark Angelo C. Purio (BIRDS-4)

01. UN/IAF workshop right before 2019 IAC in Washington D.C.

The 2019 UN/IAF workshop (as usual) occurred right before IAC.

This year, the workshop occurred on Friday (18 Oct.) through Sunday (20 Oct.) in a IAC room provided by IAF.

Kyutech students and Kyutech graduates gave presentations during the workshop.

Walter E. Washington Convention Center

Venue of this workshop

(Washington, DC)

Programme at a glance **FRI** **SAT** **SUN**

	18 October 2019	19 October 2019	20 October 2019
Morning	08:00-09:00 Registration 09:00-10:15 Opening ceremony *10:15-10:30 Coffee break* 10:30-10:50 Keynote speech 10:50-12:30 Session 1: Space for inclusiveness: Leaving no one behind	09:00-10:35 Session 3: Opportunities for space emerging countries and industries to join efforts on space science and technology *10:35-11:00 Coffee break* 11:00-11:30 High Level Keynote speech 11:30-13:00 Session 4: Space exploration for everyone	09:00-09:20 Keynote speech 09:20-10:30 High Level Panel Efforts of the space community to ensure no one is left behind *10:30-11:00 Coffee break* 11:00-11:20 Keynote speech 11:20-11:45 Closing ceremony
Lunch	*12:30-13:30 Lunch break*	*13:00-14:00 Lunch break*	
Afternoon	13:30-15:00 Session 1 (continued): Space for inclusiveness: Leaving no one behind *15:00-15:30 Coffee break and poster session* 15:30-15:50 Keynote speech 15:50-17:30 Session 2: Mobilizing everyone: Innovative space applications for socio-economic development	14:00-15:30 Interactive session *15:30-16:00 Coffee break and poster session* 16:00-17:30 Session 5: Developing collaborations for space applications	
		*18:00-21:00 Reception**	

See the link below for full program of the workshop

http://www.unoosa.org/documents/pdf/psa/activities/2019/IAF2019/IAF_agenda_final1.pdf

DAY 1

First session of the afternoon
(Chaired by Prof. Danielle Wood)

Friday, 18 October 2019, Afternoon session

Time	Activity		
13:30-15:00	**Session 1 (continued): Space for inclusiveness: Leaving no one behind**		
	Chair: Danielle Wood	Rapporteur: Georgios Profitiliotis	
13:30-13:35	Setting the scene (session 1)	Danielle Wood ①	Massachusetts Institute of Technology (USA)
13:35-13:45	She-Space International: Societal change through space science and technology education	Shimrit Maman ②	Ben-Gurion University of the Negev (Israel)
13:45-13:55	Space diplomacy: Gender equality and sustainable development	Witchayanee Ocha ③	Rangsit University (Thailand)
13:55-14:05	Extending human presence into the solar system for the benefit of all	Lara Keaney ④	National Aeronautics and Space Administration (NASA) (USA)
14:05-14:10	Q&A		

← Poster by *Rigoberto*, Kyutech graduate

DAY 2

UN/IAF Workshop
Morning Session
Sat., 19 Oct 2019

Saturday, 19 October 2019, Morning session

Time	Activity		
09:00-10:45	**Session 3: Opportunities for space emerging countries and industries to join efforts on space science and technology**		
	Chair: Valanathan Munsami	Rapporteur: Claire Nelson	
09:00-09:05	Setting the scene (session 3)	Valanathan Musami	South African National Space Agency (South Africa)
09:05-09:15	Practical strategies in using space to support the realization of the UN Sustainable Development Goals in the developing countries	Ganiyu Ishola Agbaje	African Regional Centre for Space Science and Technology Education (Nigeria)
09:15-09:25	How Alcantara's launch center can be used to promote regional development in Brazil	Michele Cristina Silva Melo	Brazilian Space Agency (Brazil)
09:25-09:35	Space-based projects to improve STEM/STEAM education from an emerging economy perspective: The case of Paraguay	Alejandro Jose Roman Molinas	Paraguayan Space Agency (Paraguay)
09:35-09:40	Q&A		
09:40-09:50	Space programmes supporting socio-economic development: How to help all to benefit	Isabelle Duvaux-Bechon	European Space Agency (ESA)
09:50-10:00	The space applications needed by Sri Lanka	Dulani Chamika Withanage	Arthur C. Clarke Institute of Technology for Modern Technologies (Sri Lanka)
10:00-10:10	Value creation from space technology through data, industry and people: The Philippines' Space Technology & Applications Mastery, Innovation and Advancement (STAMINA4Space) programme	Joel Joseph Marciano	Advanced Science and Technology Institute (Philippines)
10:10-10:20	Economic, social and environmental development through new space industry emergence	Kenneth John Davidian	SpaceBase (New Zealand)

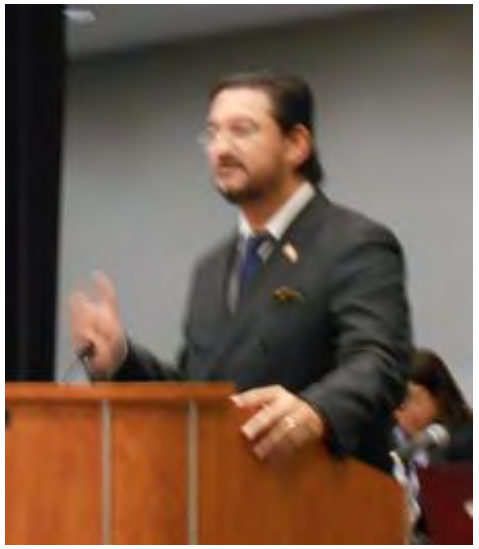
Prof Roman; BIRDS-4

Photos are on the following pages

Dulani; BIRDS-3

Prof Joel; BIRDS-2 and BIRDS-4

Prof. Roman of AEP (space agency of Paraguay)

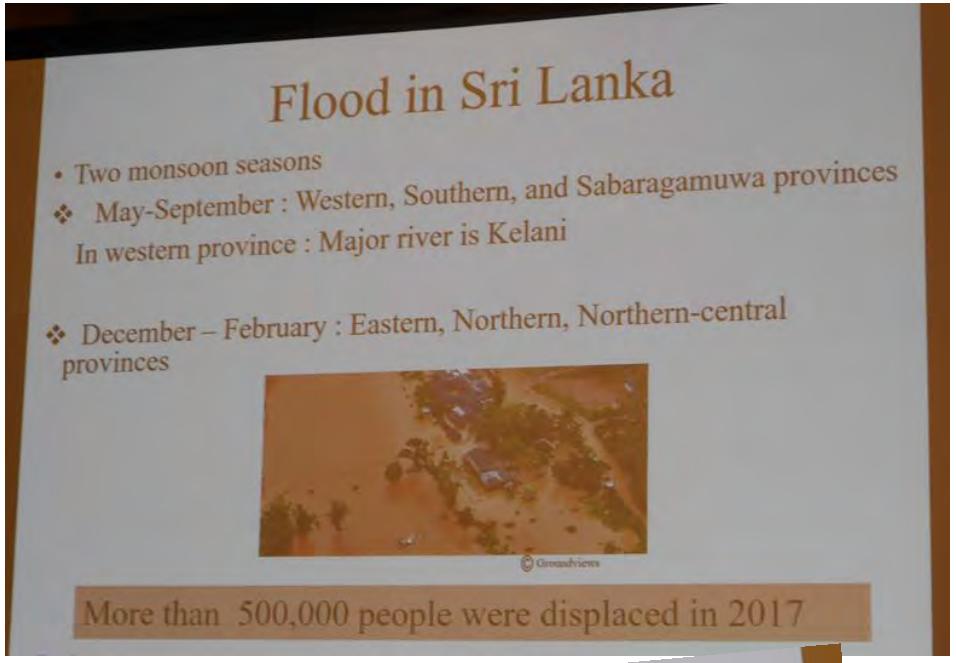


←Paraguay's **BIRDS-4** involvement is described

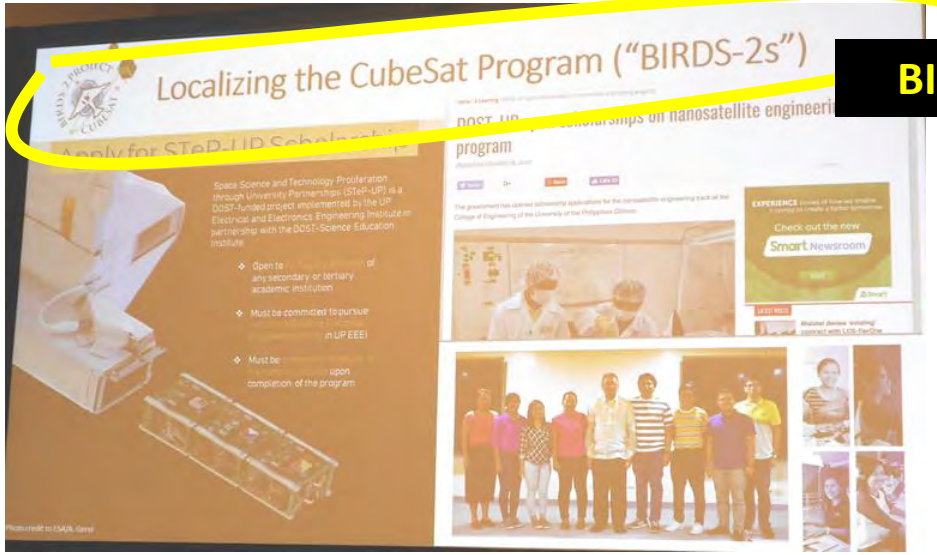
Prof Cho in a magazine issued in Costa Rica

Panel of speakers, including Dulani of BIRDS-4

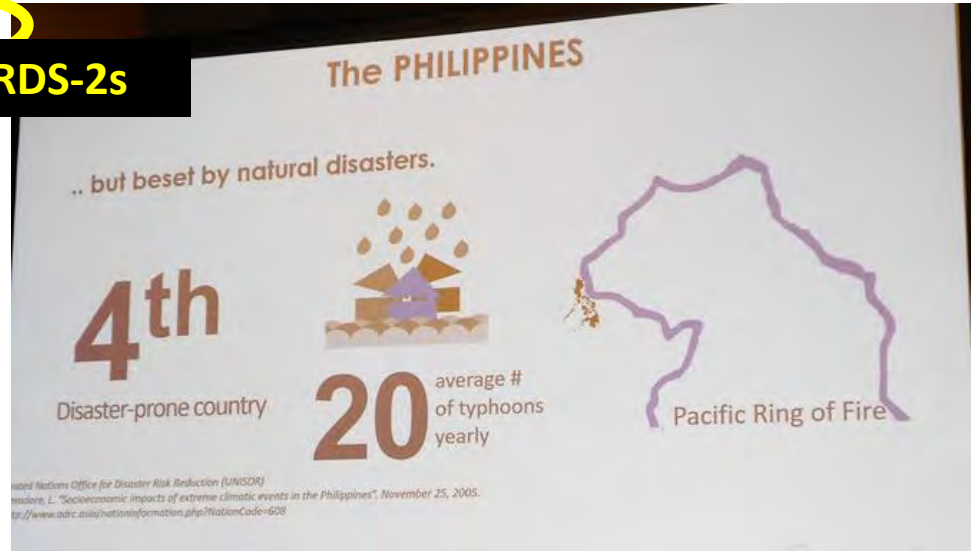
Dulani takes the podium …..



Dulani of Kyutech

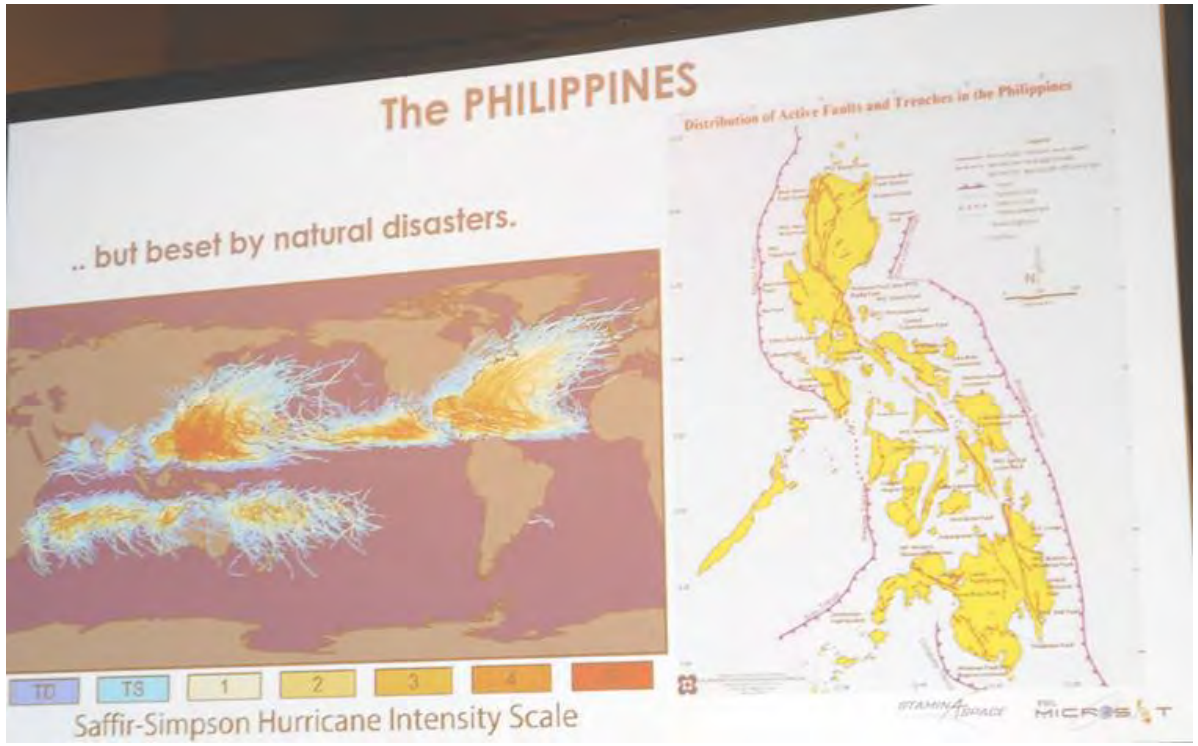


BIRDS-2s

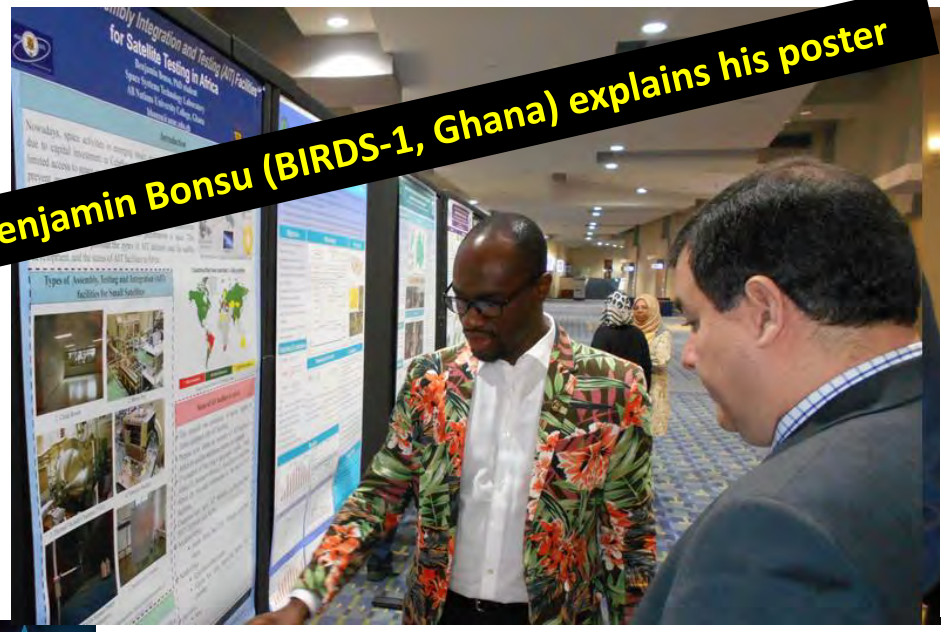


Above: *Prof Joel Marciano,* Univ. of Philippines at Diliman (UPD)

Deployment of BIRDS-2



Prof Cho with reps of AEP



Benjamin Bonsu (BIRDS-1, Ghana) explains his poster

SAT. AFTERNOON SESSION

Saturday, 19 October 2019, Afternoon session

Time	Activity		
14:00-15:30	Interactive session		
15:30-16:00	*Coffee break and poster session 2*		
16:00-17:30	Session 5: Developing collaborations for space applications and education		
	Chair: Soyoung Chung	Rapporteur: Dulani Chamika Withanage	
16:00-16:05	Setting the scene	Soyoung Chung	Korea Aerospace Research Institute (KARI) (South Korea)
16:05-16:10	The Integral Regional System of Satellite Information (SIRIS) to foster the use of space applications for the climate change: An example of regional cooperation in Latin America towards the achievements of the SDGs	Jesus Roberto Romero Ruiz	Mexican Space Agency (Mexico)
16:10-16:20	Encouraging the take up of satellite applications through joined up government: The cases of the adoption of telemedicine and AML in Europe	Alessandra Vernile	Eurisy (France)
16:20-16:30	Opportunities for space education at graduate level in INPE-Brazil for international students	Antonio Fernando Bertachini de Almeida Prado	National Institute for Space Research (Brazil)
16:30-16:35	Q&A		
16:35-16:45	SEEDS: An intercultural and interdisciplinary joint initiative by European Universities to promote space education internationally	Shrrirup Nambiar	Politecnico di Torino (Italy)
16:45-16:55	Space4Youth	Ayami Kojima	UN Office for Outer Space Affairs (UNOOSA)
16:55-17:05	Raising Awareness and Inspiring Action: Bringing the SDGs to the SpaceGen	Matteo Cappella	Space Generation Advisory Council
17:05-17:15	Leveraging Earth observation for monitoring and evaluation of environmental interventions	Anupam Anand	The Global Environment Facility
17:15-17:30	Q&A and discussion with the audience		
17:30	Closure		
18:00-21:00	*Reception*		

Photos of Antonio and Ayami on the next page

Antonio Fernando Bertachini de Almeida Prado, INPE, Brazil

19 OCT 2019

19 OCT 2019

Ayami Kojima

UNOOSA

19 OCT 2019

WORKSHOP RECEPTION OF SAT., 19 OCTOBER 2019, AT CONVENTION CENTER

President of JAXA and Prof Roman

地ビール

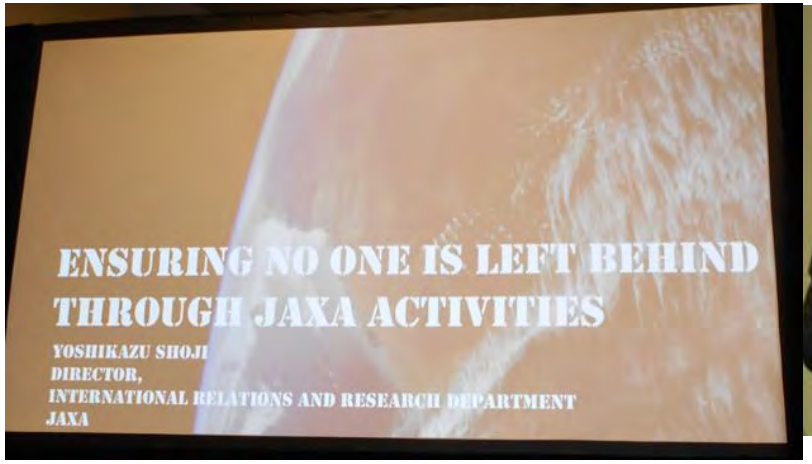
Looking down from reception floor

Morning session of Sunday, 20 Oct. 2019 （DAY 3)

Sunday, 20 October 2019, Morning session

Time	Activity		
09:00-09:20	**Keynote speech**		
	Space for sustainable development: A practitioner's perspective	Chris Lee	UK Space Agency (United Kingdom)
09:20-10:30	**High level panel: Efforts of the space community to ensure no one is left behind**		
	Chair: Jean-Francois Clervoy	Rapporteur: Irianna Vlachopoulou	
	High level panel discussion **[a]**	Simonetta Di Pippo	UN Office for Outer Space Affairs (UNOOSA)
	High level panel discussion	Marius-Ioan Piso	Romanian Space Agency (ROSA) (Romania)
	High level panel discussion **[d]**	Pascale Ehrenfreund	German Aerospace Centre (DLR) (Germany)
	High level panel discussion **[b]**	Anond Snidvongs	Geo-Informatics and Space Technology Development Agency (GISTDA) (Thailand)
	High level panel discussion **[c]**	Yoshikazu Shoji	Japan Aerospace Exploration Agency (JAXA) (Japan)

[b] [c] [a] [d]



[c]

10:30-11:00	*Coffee break*		
11:00-11:20	**Keynote speech**		
	Collaborative research of JAXA and TUS on space colony	Tai Nakamura	Japan Aerospace Exploration Agency (JAXA) (Japan)
11:20-11:45	**Closing ceremony**		
	Chair: Irianna Vlachopoulou		
11:20-11:25	Closing remarks	Jean-Yves Le Gall	International Astronautical Federation (IAF)
11:25-11:30	Closing remarks	Simonetta Di Pippo	UN Office for Outer Space Affairs (UNOOSA)
11:30-11:45	**Closure and photo opportunity**		

Morning session of Sunday, 20 Oct. 2019 (DAY 3)

Keynote speech by Prof. Nakamura, JAXA

THE OFFICIAL GROUP PHOTO OF THIS WORKSHOP

UNITED NATIONS
OOSA

27th Workshop on Space Technology for Socio-Economic Benefits:
"Ensuring Inclusiveness through Space-based Applications and Space Exploration"

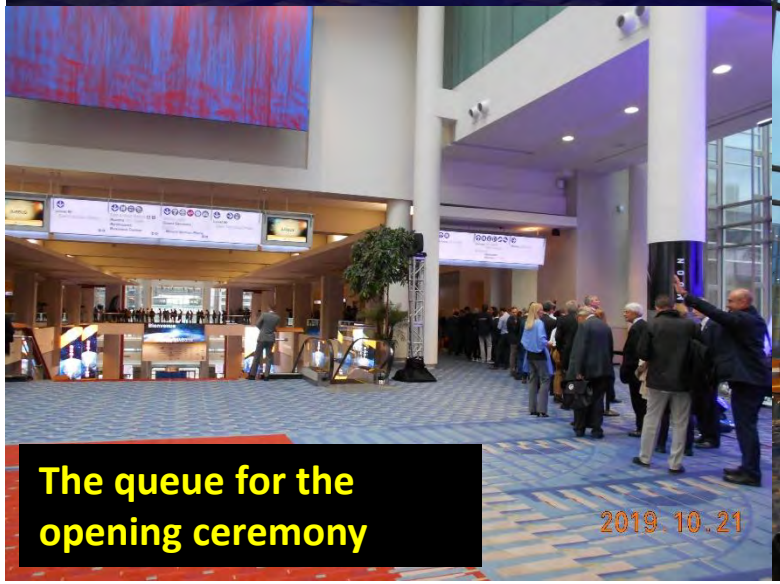
ASTRONAUTICA AD PACEM HOMINUMQUE PROGRESSUM
IAF

End of report on the UN/IAF Workshop

02. SEIC and BIRDS students participated in 2019 IAC in Washington D.C.

The IAC is organized each year by the *International Astronautical Federation* (IAF). Kyutech is a member of the IAF; as of July 2019, Kyutech is the only Japanese university that is a member of the IAF. Each year some staff and students of Kyutech participate in the IAC, the world's premier space industy event.

Walter E. Washington Convention Center



The queue for the opening ceremony

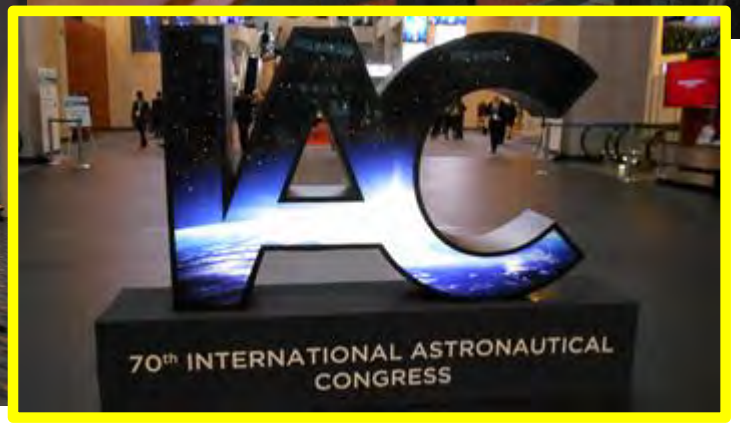
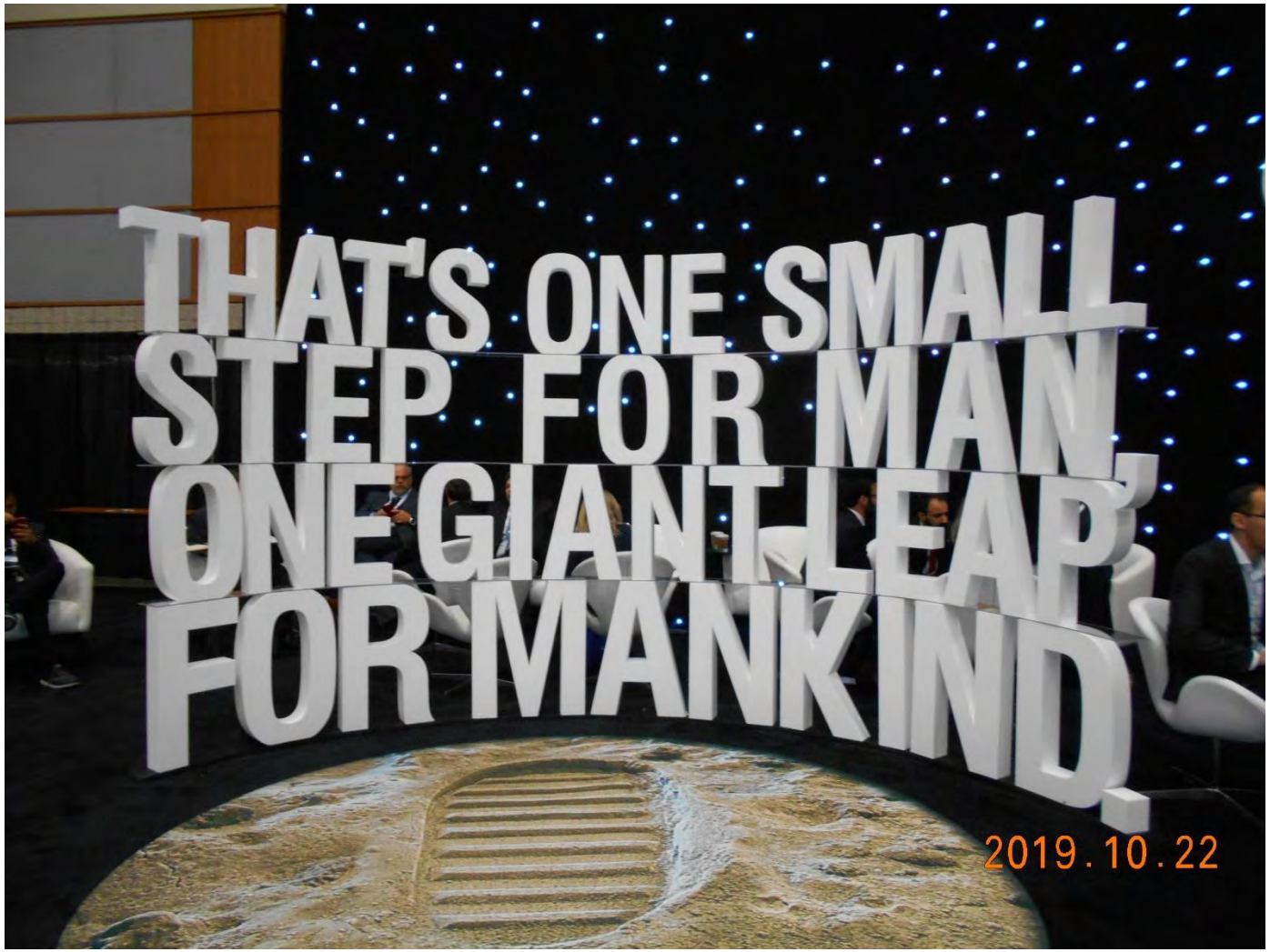
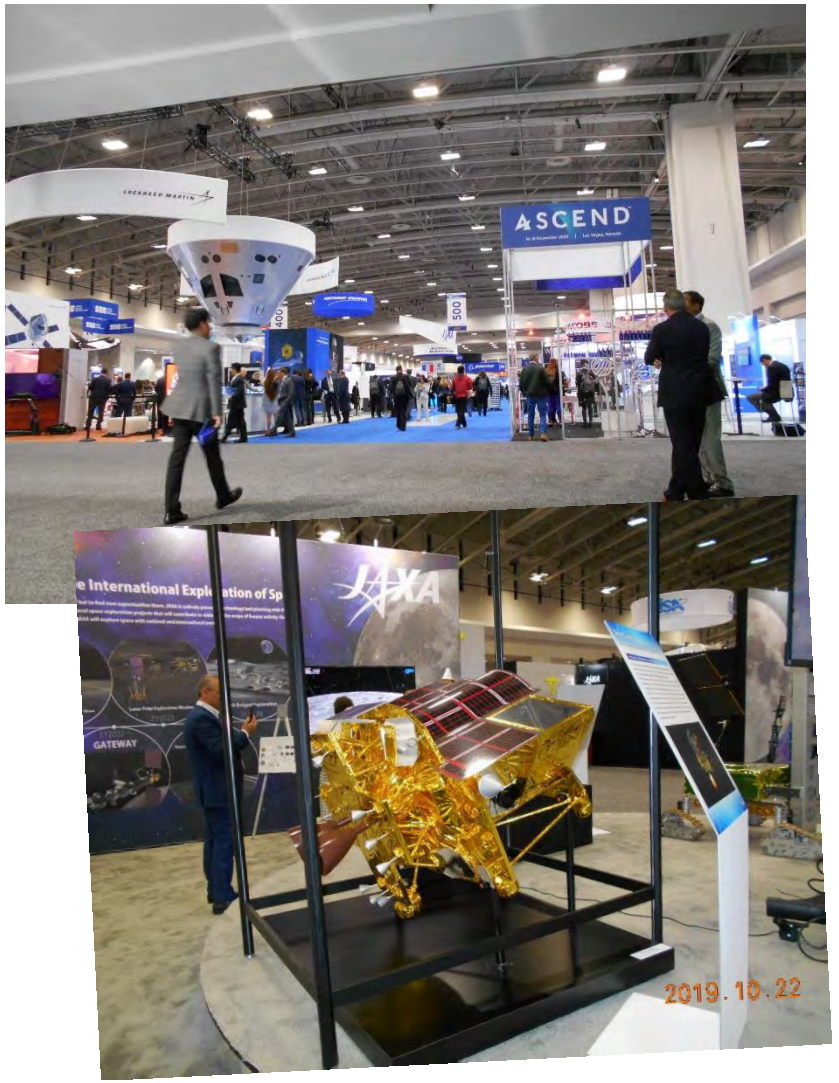


Exhibit area 展示会 of 2019 IAC



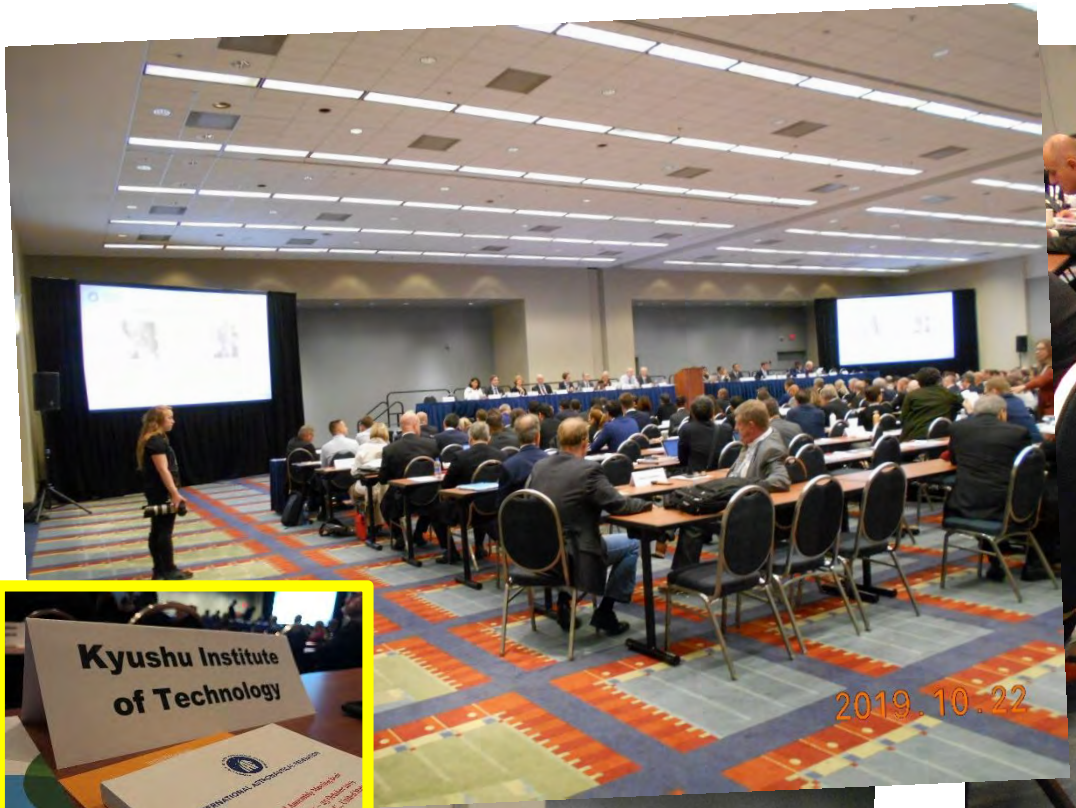


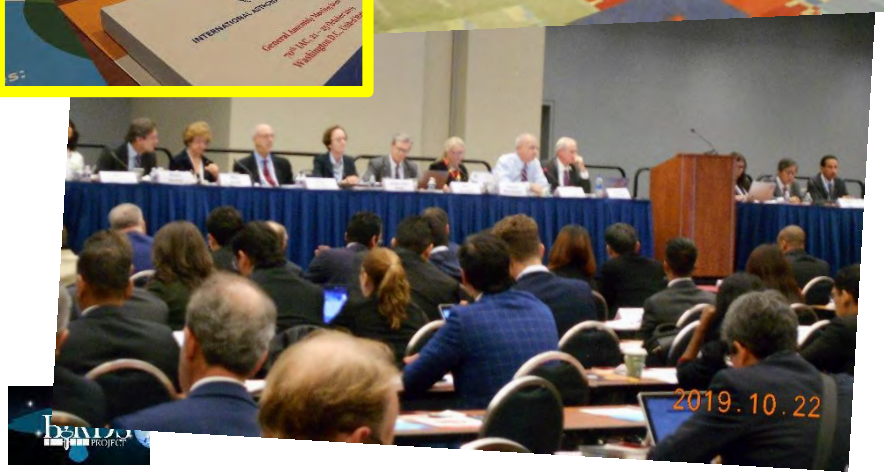
Many countries

日本イベントの宣伝

JAXA booth (left and right)

General Assembly of IAF: 3PM-6PM on 21 Oct.; with two BIRDS students





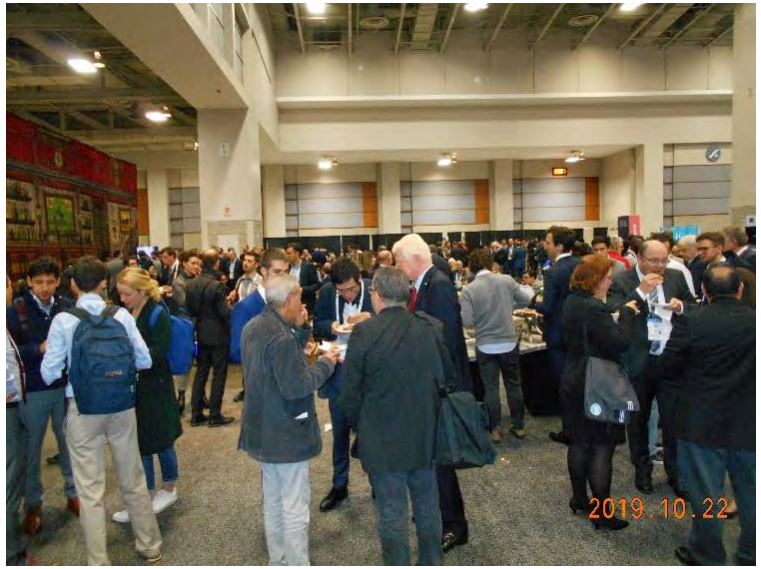
Izzie and Dulani

Evening of *IAC Day1*

◆ Ice Breaker Reception inside the Convention Center

Monday, 21 Oct. 2019

Lots of mini-burgers→



KiboCUBE: Team from the Republic of Moldova Selected for Fourth Round

June 10, 2019 (JST)

National Research & Development Agency

Japan Aerospace Exploration Agency (JAXA)

United Nations Office for Outer Space Affairs (UNOOSA)

PRESS RELEASE:
https://global.jaxa.jp/press/2019/06/20190610a.html

The Japan Aerospace Exploration Agency (JAXA) and the United Nations Office for Outer Space Affairs (UNOOSA) have been cooperating under the KiboCUBE programme launched in 2015 to provide opportunities to deploy CubeSats from the Japanese Experiment Module “Kibo” of the International Space Station (ISS).

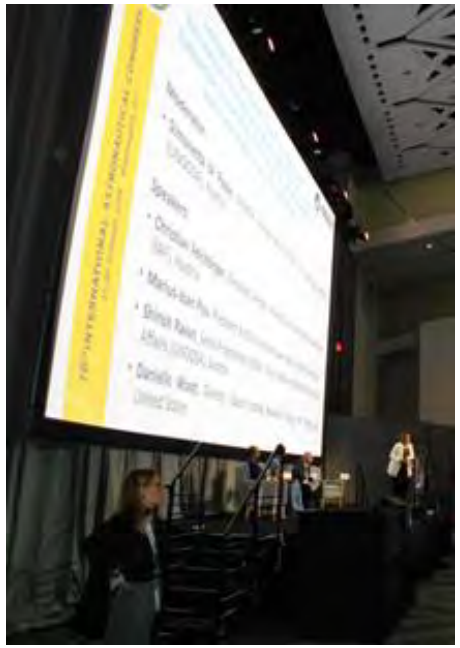
Rep. of Moldova Luis (Guatamala)

赤城さん

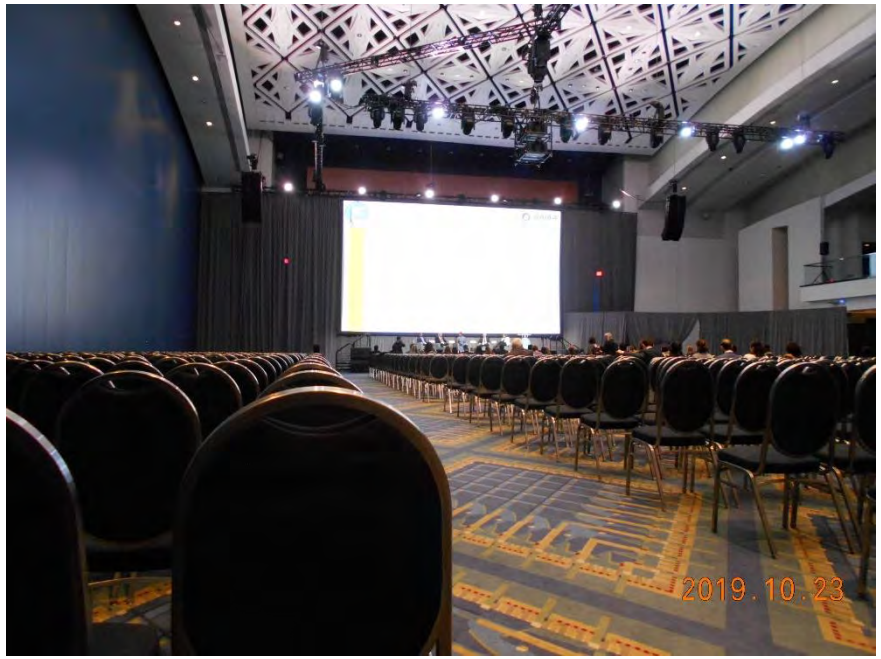
Dr Wakata

3:00 PM; 22 Oct. 2019

Dr Wakata proposes extending UN/JAXA KiboCube to 6th and 7th rounds;
Director Di Pippo says,
"Yes, we accept."



Results of UN/IAF workshop are discussed in Ballroom C at 16:40 on 22 Oct. 2019. Moderator is Director Di Pippo of UNOOSA.



Japan Night

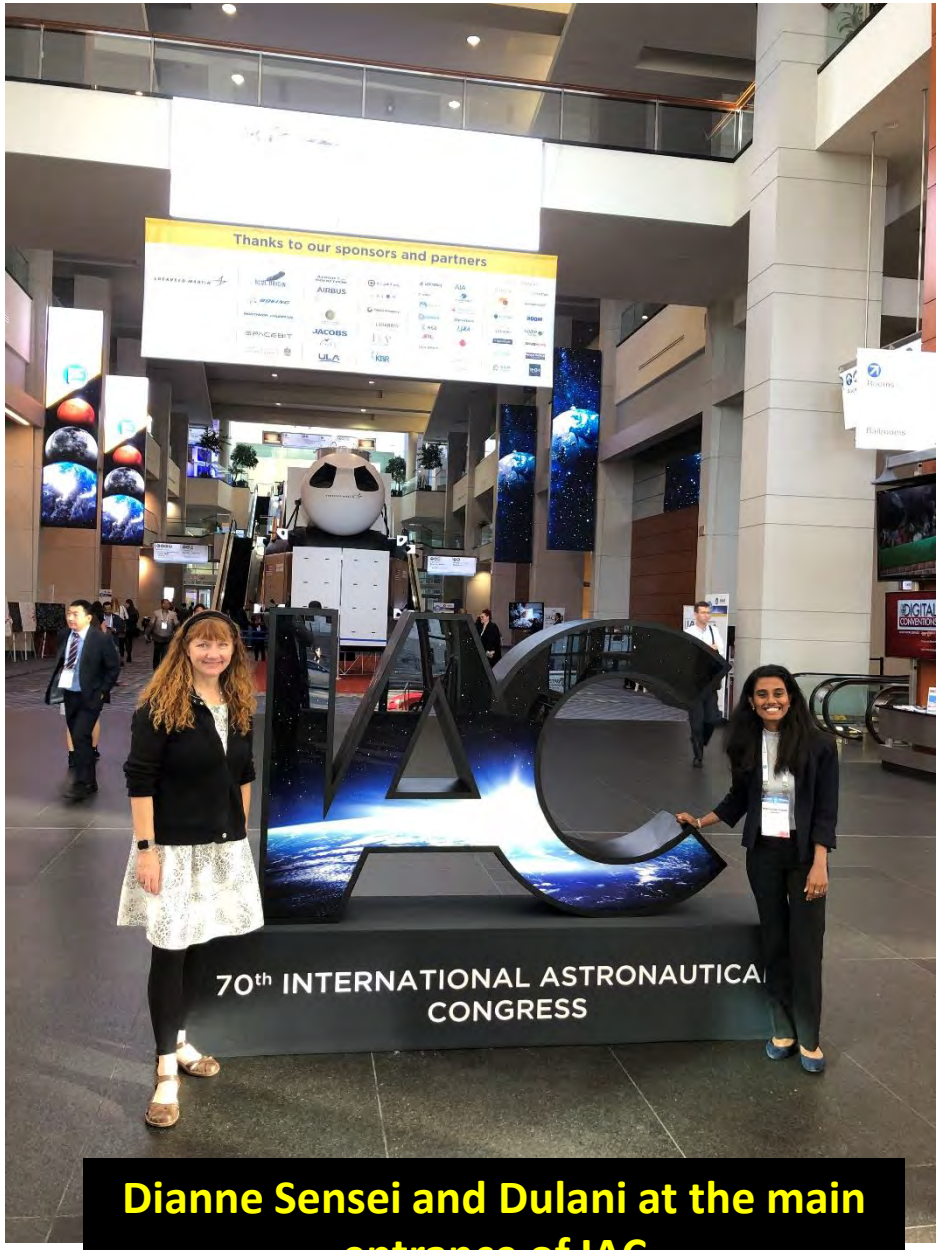
at

the JAXA booth

of 2019 IAC

It was well-attended.

← SEIC students jumping for joy



Dianne Sensei and Dulani at the main entrance of IAC

KEYNOTE: *Experience and Findings by Kyushu Institute of Technology to Have a Successful Space Capacity Building Program*

INTERNATIONAL ASTRONAUTICAL FEDERATION
Connecting @ll Space People

Welcome to the IAF Submission system!

IAC PAPERS ARCHIVE | PUBLIC WEBSITE | MY PAPERS

Home > event > IAC-19 > E1 > 4 >

SESSION 4

Title
In Orbit - Postgraduate Space Education

Description
This session will explore innovative programs for postgraduate students. This can include the development and delivery of innovative courses, project-based work, and work placements. Emphasis should be placed on how the program is structured for maximum impact, how the impact is measured and how the lessons learned are being applied to other courses.

Date
2019-10-23

Time
09:45

Room
144C

← Date, time, place

IPC members
- Co-Chair: Prof. David B. Spencer, The Pennsylvania State University, United States;
- Co-Chair: Dr. Camille Alleyne, NASA, United States;
- Rapporteur: Ms. Carol Carnett, International Space University (ISU), United States;
- Rapporteur: Mr. Remco Timmermans, International Space University (ISU), United Kingdom;

PAPERS

Order	Time	Paper title	Mode	Presentation status	Speaker	Affiliation
1	09:45	KEYNOTE: Experience and Findings by Kyushu Institute of Technology to Have a Successful Space Capacity Building Program	30	confirmed	Prof. MENGU CHO	Kyushu Institute of Technology

Prof. Cho delivers this keynote address during this session.

Waiting for the session to start . . .

The delegation of Paraguay

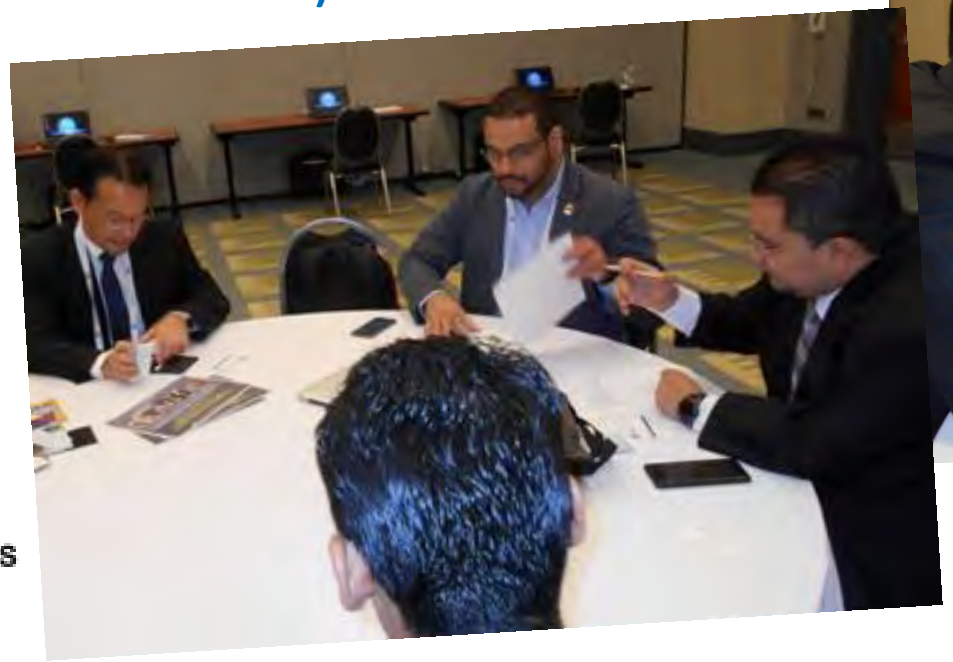
On the last slide were the famous *Ten Rules of LaSEINE*

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

Above:
Chance encounter with Amelia, right before key note address by Prof. Cho.

8:30 am meeting (23 Oct) with members of the *Morazan MRZ-SAT CubeSat Project* (Honduras, Costa Rica, Guatamala).

Below are Dr Fernando Zorto and Dr Eduardo Gross, faculty members of UNAH, National Autonomous Univ. of Honduras



UNAH
UNIVERSIDAD NACIONAL AUTÓNOMA DE HONDURAS

The streets of Washington DC

LaSEINE Night

19:00-21:30
24 Oct. 2019

This was our venue

Taiwo gives a toast to Prof. Cho for receiving IAF's best educator award: ***The Frank J. Malina Medal***

2019 IAC "LaSEINE Night" at La Tasca in Washington, DC

Dr John Bellardo's cool CubeSat shirt (he is seated at the left in the group photo)

← This group photo was taken with Dulani's excellent iPhone camera

This was wonderful and magical

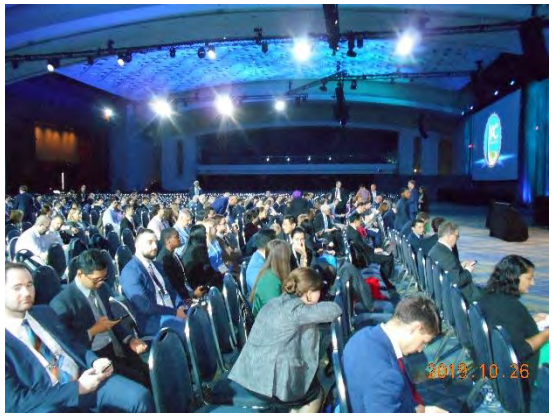
Friday, 25 Oct. 2019, Washington, DC


2019.10.26


2019.10.26


Waiting for the ceremony to start


2019.10.26


2019.10.26


2019.10.26


2019.10.26


JAXA delegation


AIAA
ASTRONAUTICAL CONGRESS
Pascale Ehrenfreund
IAF President
Seishiro Kibe
IAF Vice-President
Honours and Award
The two presenters of the various IAF awards

Friday, 25 Oct. 2019,
Washington, DC

Prof Cho receives
the Frank J. Malina Astronautics Medal
of the IAF

The Medal


2019: 120 applicants → 25 winners of ESL award of IAF
IAF Emerging Space Leaders
AIAA
70TH INTERNATIONAL ASTRONAUTICAL CONGRESS
21-25 October 2019 | Washington, D.C.
Divya Rao Ashok Kumar
India
Rigoberto Reyes Morales
Mexico
Martin Ristov
Canada
Avid Roman Gonzalez
Peru
Faviola Romero
Bolivia
Aqeel Shamsud
Malaysia
Out of 25, 4 winners are from Kyutech !
Yasir (Sudan)
Izrael (Philippines)
Femi (Nigeria)

Friday, 25 Oct. 2019,
Washington, DC

The Kyutech delegation of the 2019 IAC closing ceremony

Prof Cho, 3 ESL winners, *et al.*

Celebration time: dinner (after the closing ceremony) at 1422 10th Street, NW, Washington, DC

Izzie, husband of Hala, Hala, and Cosmas (Kenya, PNST)
-- the house was rented via AirBnB.
Menu: steaks, fries, salad, peas, pasta, and a lot of rice.

Dianne sensei, Leo, Dulani, and Femi, took a road trip from Wash DC to Harpers Ferry, West Virginia, after the IAC closing ceremony.

The fellow above belted out some of Dulani's favorite country music tunes.

End of the report on the

2019 IAC

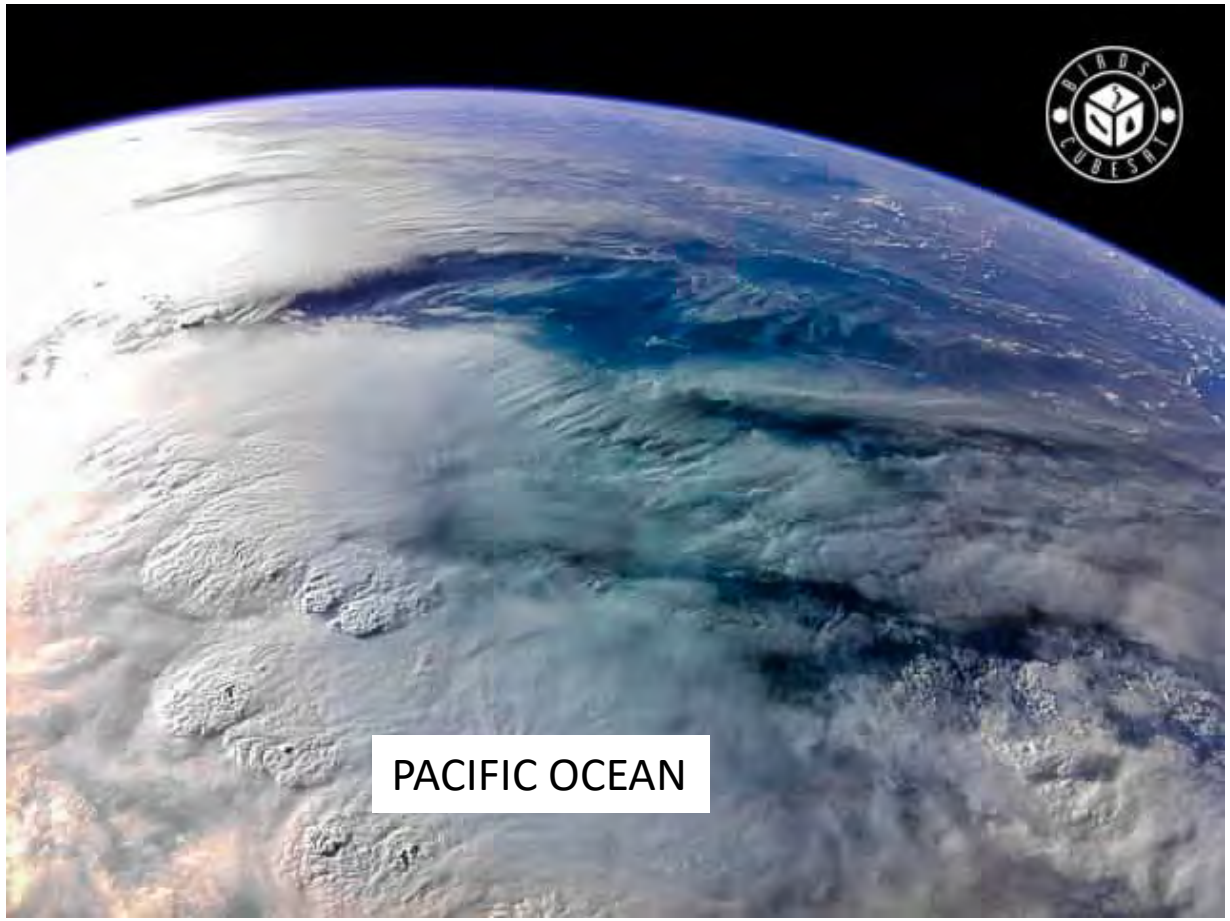
in Washington, DC

Some preliminary earth images taken by BIRDS-3 satellites

by M. Kishimoto (Japan, BIRDS-3)

10 Nov. 2019

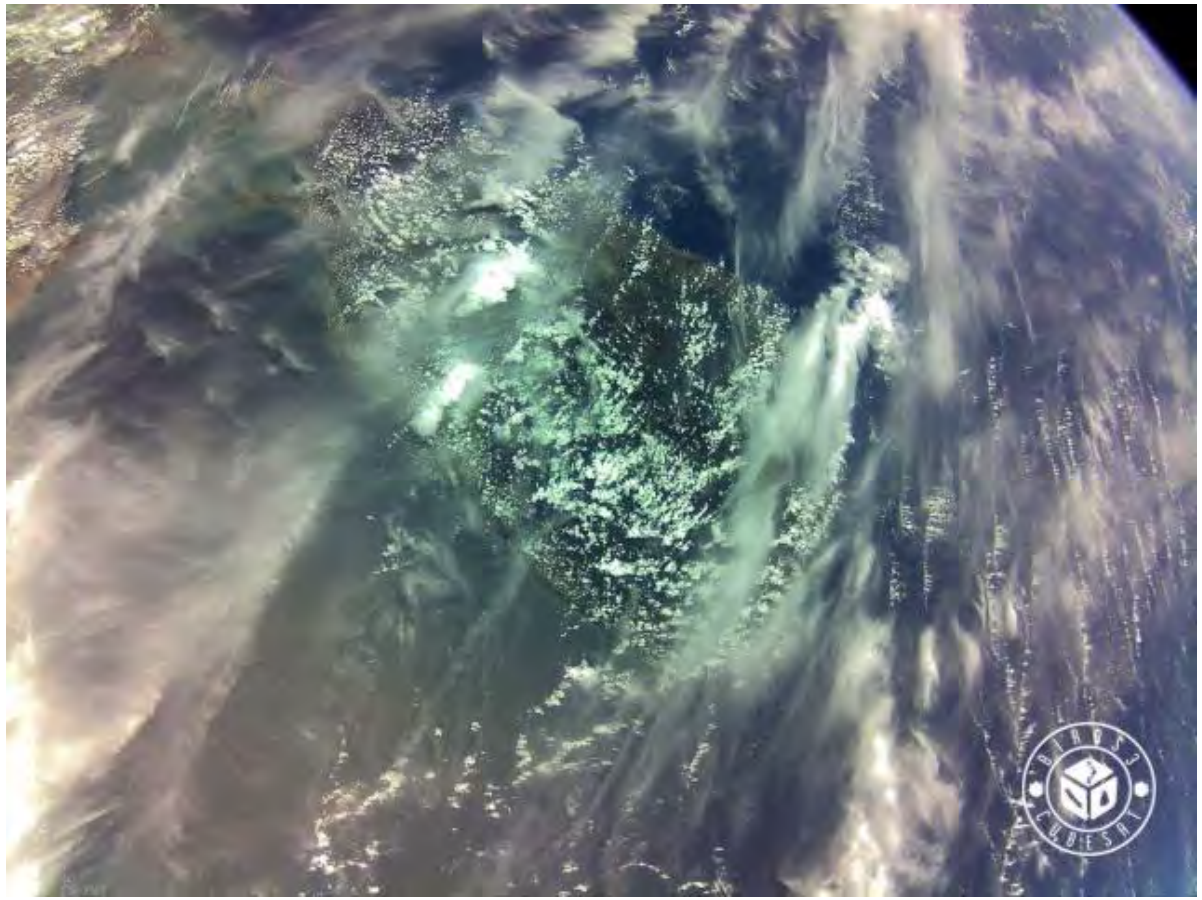
BIRDS-3 Image Gallery



It is the first photo taken by BIRDS-3 satellite.

Each image takes about 2-3 days to downlink completely

BIRDS-3 Image Gallery



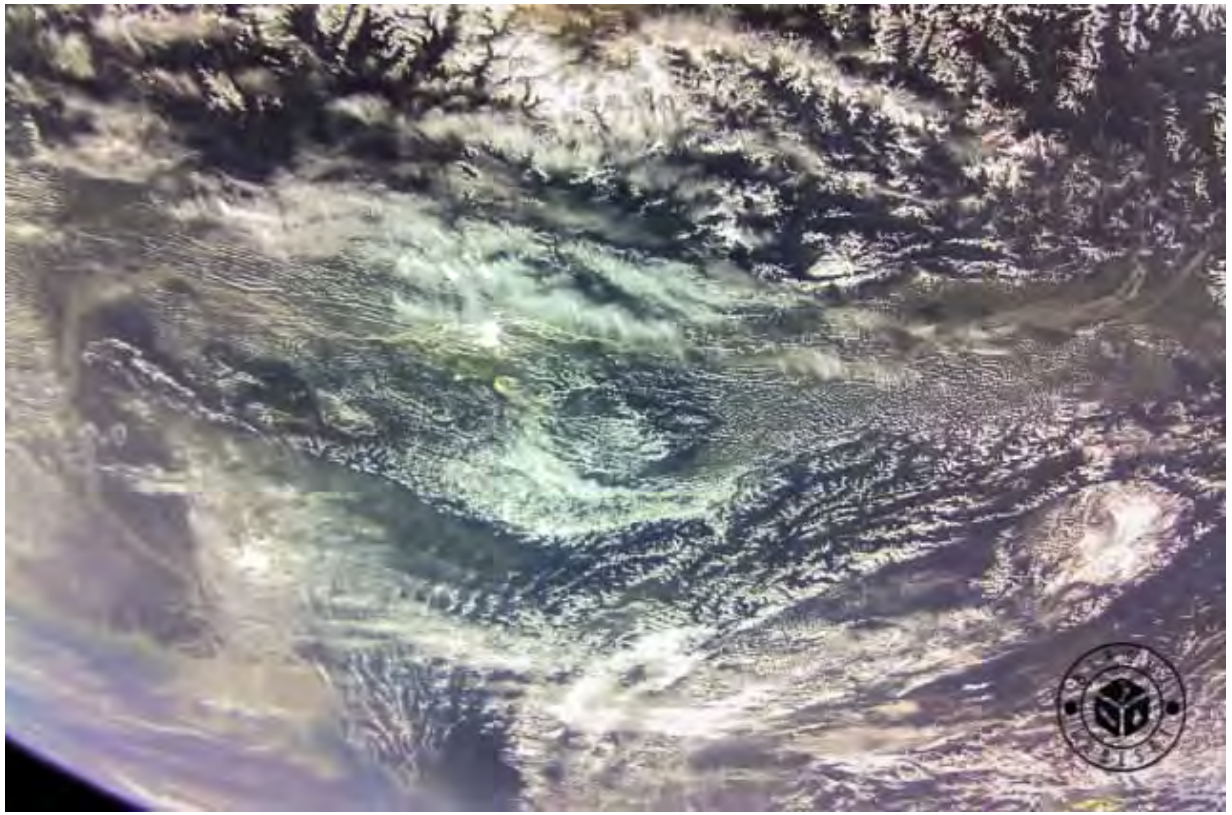
The island of Sri Lanka has been taken multiple times thanks to the uplinks done by ACCIMT in Colombo

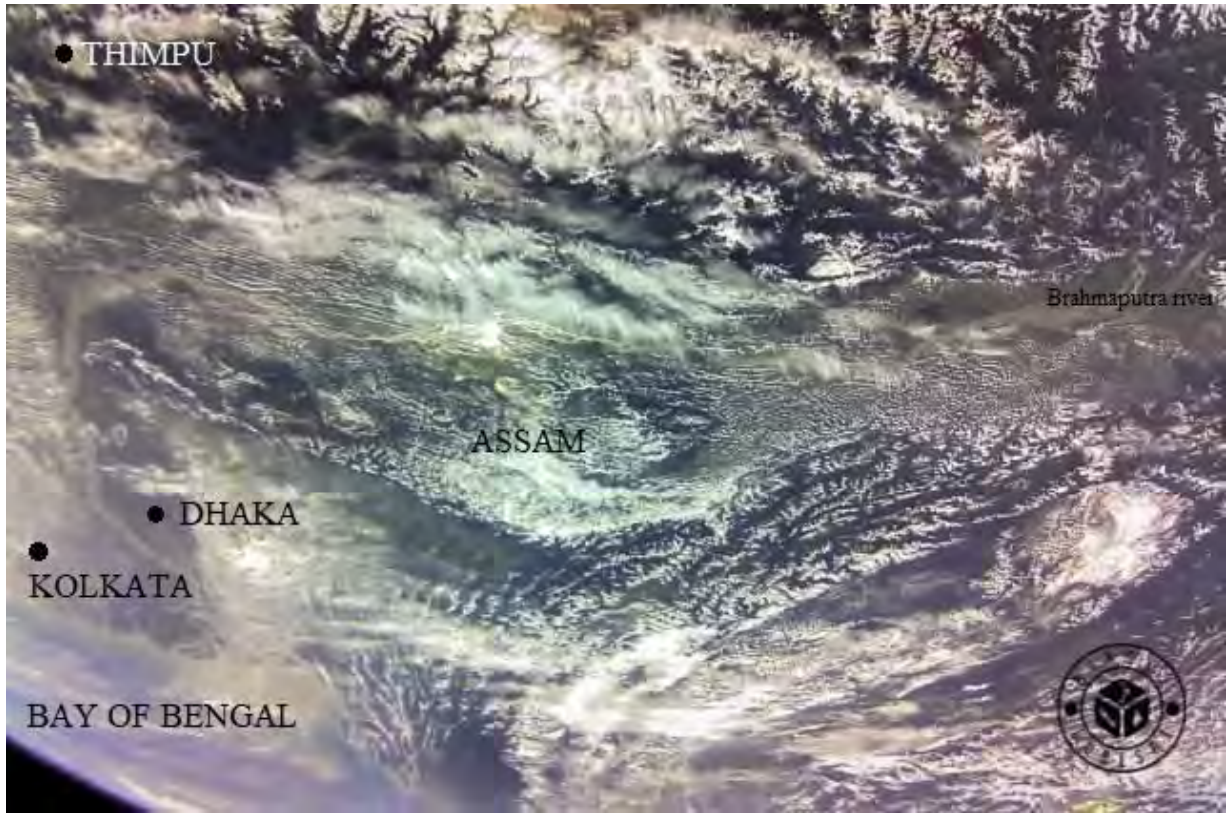
BIRDS-3 Image Gallery

The above image was commanded from National University of Mongolia. Image shows the capital, Ulaanbaatar

The above image was commanded from Kyutech. Image shows the Pacific Ocean

BIRDS-3 Image Gallery

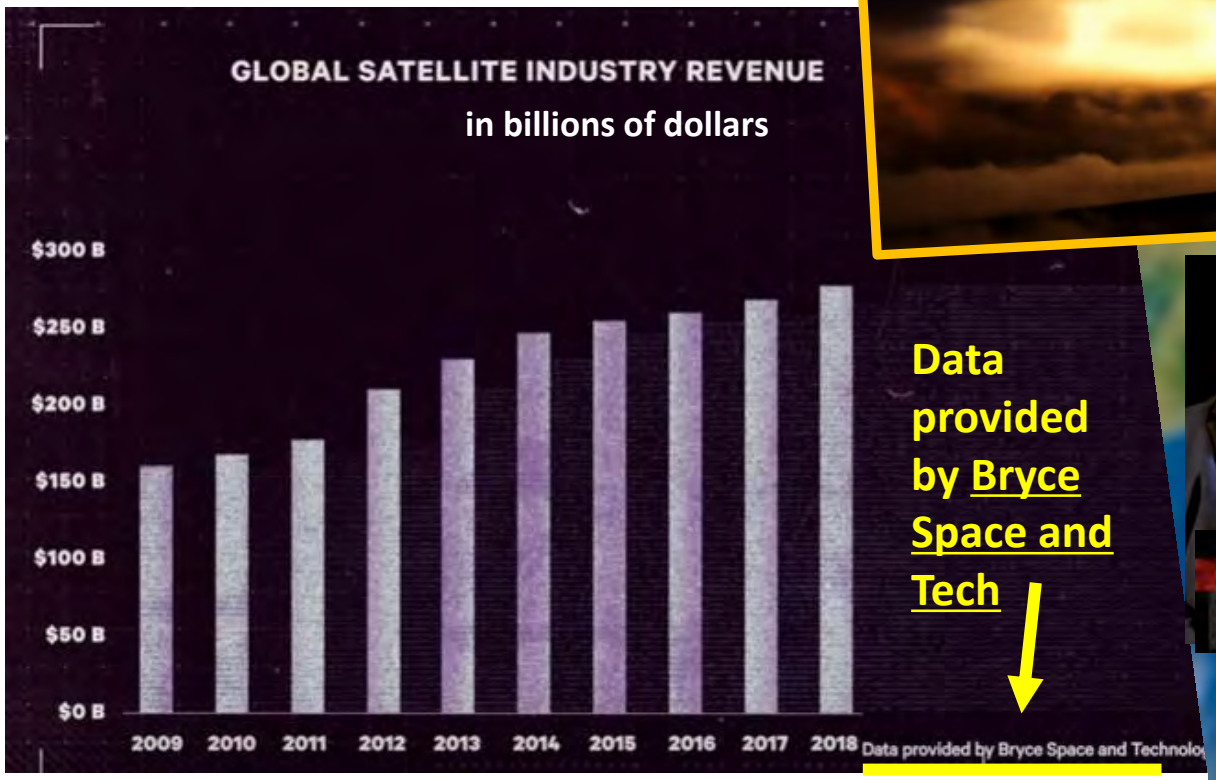




BIRDS-3 satellites were also able to take the capitals of Bangladesh (Dhaka) and Bhutan (Thimpu). The locations were identified based on the location of Bhramaputra river and the Bay of Bengal

More images will be released in the next issue of the BIRDS Project Newsletter

04. Outstanding video about the space business



Data provided by Bryce Space and Tech

#BloombergGiantLeap #Space #Future
Space: The Final Business Frontier
220,865 views -- Premiered Oct 22, 2019

This is a great video about the current global space business

22-minute video: https://www.youtube.com/watch?v=VlbZTyBuFlQ&t=833s

05. 3D passive microwave observations every point on Earth every 15 minutes

https://www.orbitalmicro.com/

Orbital Micro Systems

For the first time, near real time weather and Earth observation data will be available to meet the timely needs business. We bring both the satellite technology and the data infrastructure together to meet the needs of aviation, insurance, agriculture, and commodities along with several other industries.
Our new Space technology development has enabled the launch of Global Environmental Monitoring System our fleet of cubesat satellites. GEMS will revolutionize the way we understand our planet by capturing 3D microwave observations every point on Earth every 15 minutes.

This is potentially very interesting …. Editor

BIRDS-3 Trip to Itoshima

(17 and 18 Sept. 2019)

by Pooja [Bhutan]
and Makiko [Japan]
(both BIRDS-3)
25 Oct. 2019

Day 1: Travel to Itoshima

We arrived at our beautiful house for 2 days and went shopping at a nearby super

We had `Mentaiko' for lunch. It is marinated cod roe and is a popular dish in Fukuoka

Hari shows his flower momo

Day 1: Dinner

The kitchen side was handled by Abhas and Pooja

Meal of the day was `Momo', dumpling in a Nepali style with spicy peanut sauce

Other varieties included grilled chicken wings prepared by Pooja

Sasaki enjoys chicken wings!!

Day 2: Breakfast

The day started with a hearty breakfast that included bread toast, scrambled eggs, miso soup, and homemade yogurt

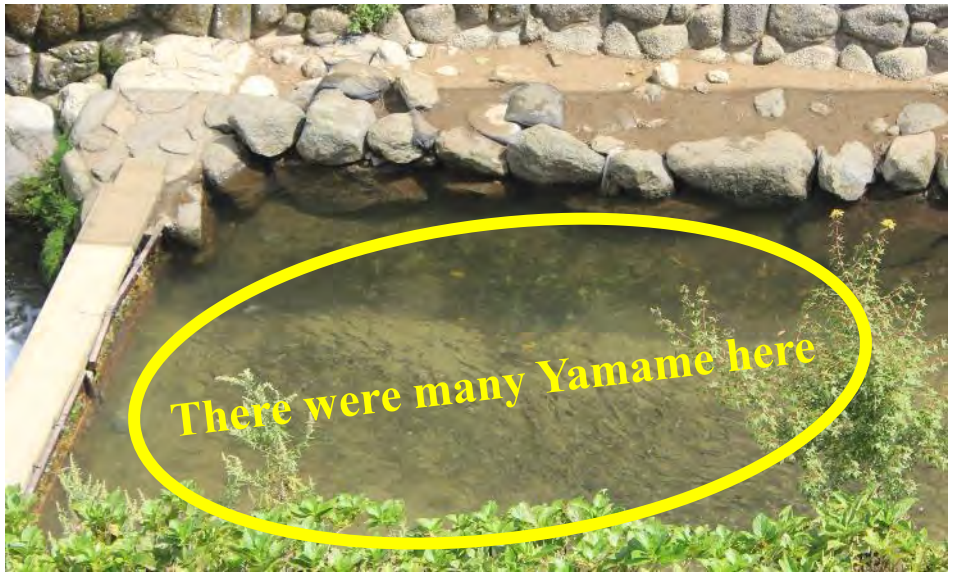
Sasaki prepared the delicious Miso soup

The workload was shared by all the team members. Tharindu, Hari and Kakimoto take turns in doing the dishes

Day 2: Shiraito Falls

We went to see *Shiraito Falls* on the 2nd day. After getting off the bus, we had to walk to Shiraito Falls for about 40min. For lunch we ate the fish called Yamame. There is Yamame fishing pond, so we also fished for our dinner.

Day 2: Fishing for Yamame



Kakimoto san cooked Yamame for us.

Day 2: Dinner

Day 2 evening was spent eating Nepali style chicken and taking a walk in nearby park:

Meal of the night was “Puri and Aloo”, which is a Nepali style fried bread and potato curry

END OF BIRDS-3 TRIP REPORT

The dinner also included dry bread called *roti*

The trip ended with a heavy breakfast next morning and returning to Kyutech

WORLD SPACE WEEK IN SUDAN 2019

Report of Activities

by

Dr. Moutaman Mirghani

Associate Professor, ISRA

WSW National Coordinator of Sudan

Introduction

- The World Space Week (WSW) has been celebrated in Sudan within the period from Sunday 6th to Saturday 11th of October 2019. For the fifth time, WSW was organized by the Institute of Space Research (ISRA), as it has been organized by ISRA in 2015, 2016, 2017 and 2018 respectively.

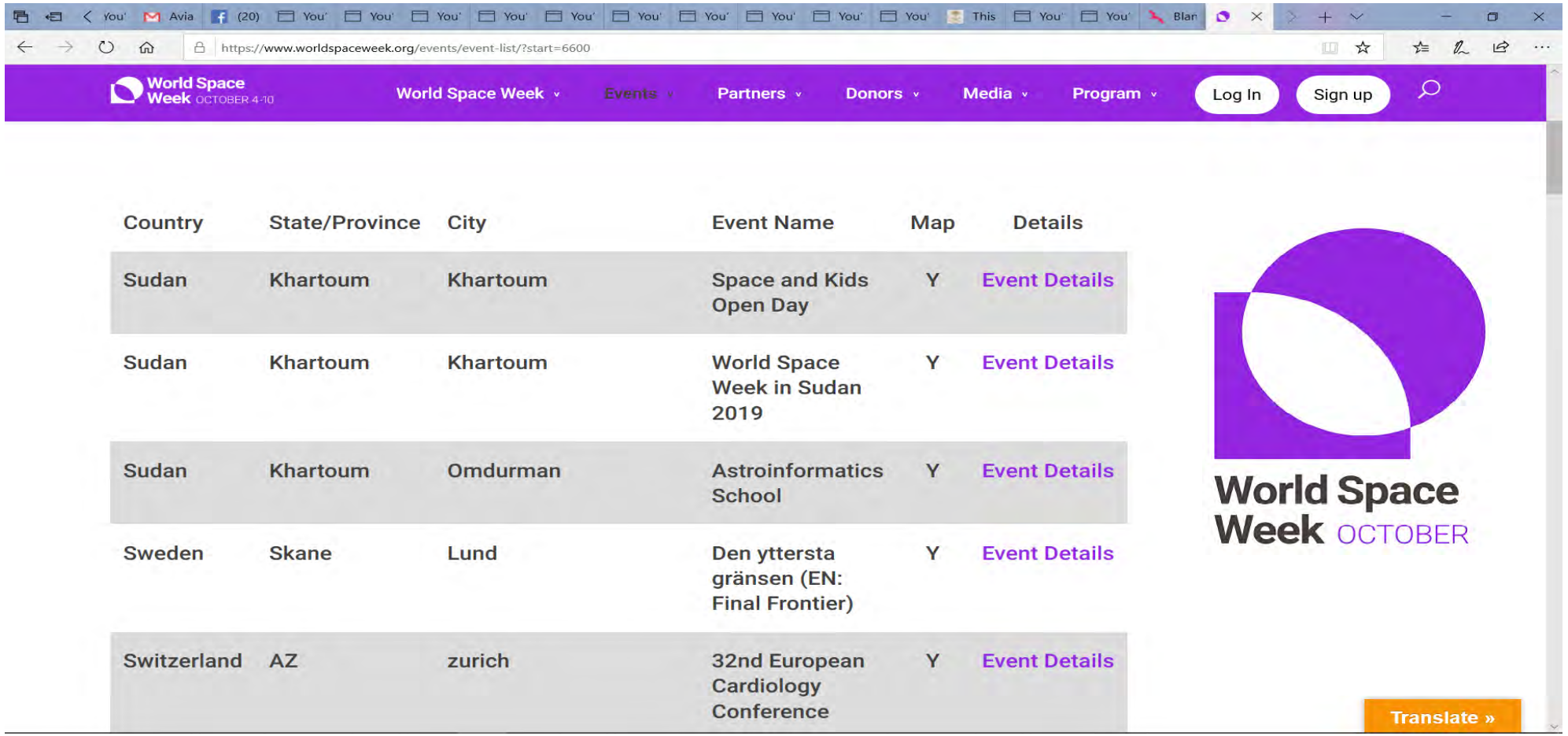
- The recognised National Coordinator of WSW in Sudan, Dr. Moutaman Mirghani, has organised plans and supervised activities together with the executive committee that was selected from researchers and administrators in **ISRA.**

Scheduled Program

- The program that had been scheduled by the executive committee before the events taking place, and registered on the website of event listing of the WSWA was as follows:

1. Opening Ceremony.
2. Space Exhibitions.
3. Space and Aerospace Technology Day.
4. Astronomy and Space Physics Day.
5. Cosmology Theoretical Physics Day.
6. Astroinformatics School.
7. Space and Kids Day.

- The screenshot below illustrates the listing of WSW 2019 in Sudan events that were implemented this year. The item World Space Week in Sudan included 3 days seminars, while Astroinformatics School was of 2 days.



Opening Ceremony

- The Opening Ceremony for WSW2019 in Sudan took place at the Grand Hall of the Ministry of Higher Education and Scientific Research in Khartoum during the period from 11:00 AM to 11:30 AM of Sunday 6th of Oct 2019.
- It included a speech by the NC of the WSW in Sudan that included description and clarification of the WSW idea and history, reasoning of start and end dates of the week, WSWA role and the benefits that realized by celebrating the week annually all over the world.
- Finally, he declared the launch of activities of WSW in Sudan 2019, including the Space Exhibitions arranged for the three consecutive days of the seminars. The number of audiences in the Opening Ceremony was about 350 persons, in addition to live broadcast on Facebook.

Space and Aerospace Technology Day

- According to the theme of WSW 2019, which is the Moon, Dr. Moutaman Mirghani presented Apollo 11 Mission in 1969 in detail. He made a short historical background about the Moon Race that took place between US and USSR during the sixties and successes and failures that happened. The presentation involved mentioning different trials and diverse spacecrafts used to land on Moon.
- Finally, he described Apollo program and the phases of the program that ended up with the safe landing of first humans on the surface of Moon in 1969. He concluded with the significance and advantages of Apollo program, and the benefits achieved for NASA, and the space sector all over the world due to the success of Apollo 11 mission 50 years ago.

- Afterwards, Dr. Mayada Abdel Ghadir has made a presentation about launching of GEO communication satellites for communication purposes. She spoke about the commercial and national benefits realized by launching your own satellite, and the cost that is expected.
- Then, the researcher Eng. Nasra Abdel Hameed from ISRA made a presentation listing different space missions to explore the space, as well as space telescopes that were launched to assist in deep space exploration of the universe.
- Later, there were two presentations related with the development of Unmanned Aerial Systems for farming and agricultural purposes. Sundos A. Wasfi from ISRA made a presentation for Mayada UAV research project that takes place at ISRA and the feature of the small aircraft that is intended for aerial surveillance of farms to inspect plant quantity and health.
- Then, Eng. Mohammed Abdel Aal presented the invention that he achieved in smart and precise agriculture, which is the Flying Farmer. This UAV is an autonomous robot that digs the ground and puts seeds inside the soil, to make use of the rain season, in order to combat desertification in North Sudan.

Astronomy and Space Physics Day

- This special event took place on Monday 7th of Oct 2019 during the period from 11:00 AM to 03:00 PM.
- It started with a presentation by Eng. Nidaa M. Mukhtar about Health Effects of Mobile Base Stations on Humans, which was concerned about the hazards of the radiation caused by those terrestrial stations and the side effects arise.
- Then, researcher Hiyam Abubakr from ISRA made a presentation regarding Lunar Calendar used in Sudan and other countries.
- After, Dr. Anwar Ahmed Osman made a rich lecture about Dangers of Near-Earth Objects (NEO) and probabilities of catastrophic hits by asteroids.

- The Last session was mainly intended for the young researchers in space science and technology so as to present their work to the public.
- The three student researchers from the Department of Astronomy and Meteorology of Omdurman University; Einas Ibrahim, Esra T. Adam and Abubakr Mastour made three presentations which are Life on Other Planets, Black Holes, and Gravitational Waves respectively.
- The number of audiences was about 300 persons. The event was covered by the documentation center of the National Center for Research (NCR).

Cosmology and Theoretical Physics Day

- This seminar took place on Tuesday 8th of Oct 2019 during the period from 11:00 AM to 03:00 PM. It included a long presentation from the scientist Salah Mabkhout from Zamar University in Yamen, with the title Paradigm of Hyperbolic Universe Compared to Paradigm of Flat Universe.
- In this session, he illustrated his new paradigm using equations to prove it solves dilemma of dark matter and dark energy. He also claimed that model provides no contradiction between the theory of General Relativity and Quantum Mechanics.
- Prof. Abdel Malik Abdel Rahman, Professor of Theoretical Physics attended the session and made his remarks on the proposed concept of Salah Mabkhout.

Astroinformatics School

- This 2-days school was organized with the cooperation between ISRA and the Department of Astronomy and Meteorology of Omdurman University on Wednesday 9th and Thursday 10th of Oct 2019.
- Wathela Hamed from ISRA with Tamador Khalil and Ismail Abdalla from the Department of Astronomy and Meteorology arranged the program for the school, which was intended for a class of 30 students studying astronomy. The program was as shown in this table.

Day 1 Time	Wednesday	
10:30-11:00	Welcome, Data Type in Astronomy	Tamador
11:00-11:20	Intro to ds9 software	Ismail
11:20-11:40	Data Visualization	Ismail
11:40-12:00	Introduction to Python	Wathela
12:00-12:30	**Break**	
12:30-13:30	Practical: ds9 Software	Tamador
13:30-14:30	Practical: Intro-python	Wathela
14:30-16:00	Tutorial	Ismail

Day 2 Time	Thursday	
10:30-11:00	Big data challenge	Wathela
11:00-11:20	Data exploration, analysis and visualization with pandas	
11:20-11:40	Introduction to Machine learning	
11:40-12:00	Classification examples with machine learning algorithms	
12:00-12:30	**Break**	
12:30-13:30	Practical: data analysis with pandas	Tamador
13:30-14:30		Wathela
14:30-16:00	Tutorial	Ismail

World Space Week OCTOBER

Space and Kids Day

- This open day event was arranged in Fun Time Kids Club on the last day of the WSW in Sudan, Friday 11th of Oct 2019, within the period from 6:00 PM to 10:00 PM.
- It included space exhibitions, which comprised models of the solar system, telescopes, astronaut suit, gravitational waves simulator, posters, videos, in addition to models of satellites, rockets, drones and Hubble telescope.
- Most of those models were contained indoor, while a significant part was dedicated for children to draw and assemble pieces. Some telescopes were located outdoor and were provided to the audience to observe the surface of the moon.


Fun Time Kids Club
نادى اوقات المرح للاطفال
حيث للمرح عنوان . . .
Where kids can explore
a new meaning of Fun
Tel : 0903441814 - 0900201365 - 0912381085
Facebook : Fun Time Club Sudan

Some Photos during WSW 2019

END OF THE WSW REPORT FROM SUDAN

08. Cal Poly students gave presentations during weekly seminar

Presentations by Exchange Students

August 8, 2019 November 6, 2019

The following presentations were given by the exchange students from Calpoly on 7th August 2019.

1. Bobby Reid_Cho Lab Seminar_7 Aug 2019
2. Kent_Rush_Cho Lab Seminar_7 Aug 2019

The exchange students from Calpoly gave the following presentations on October 30, 2019.

1. Alyssa Ralph_Cho Lab Seminar_30 Oct 2019
2. Charles Van Steenwyk_Cho Lab Seminar_30 Oct 2019

To access the above links and to download their slides, please go here:
https://birds3.birds-project.com/lab-news/presentations-by-exchange-students/

09. Futaba satellite project of Kyutech; funds raised by crowdfunding

衛星開発プロジェクトによるクラウドファンディング実施中
更新日:2019.08.23
本学の学生プロジェクトの1つである「衛星開発プロジェクト」が、開発した人工衛星を打ち上げるため、READYFOR株式会社のクラウドファンディングサービスを利用して、JAXAとの契約費用への支援を募集しています。

本学は、寄附金獲得による研究の活性化や学生の部活動の支援を目的として、クラウドファンディング運営会社と業務提携しており、今回は、本学2回目のクラウドファンディング実施となります。

当プロジェクトを応援していただける方々からの温かいご支援をお待ちしております。

『九工大から宇宙へ!超小型人工衛星「ふたば」!!』

●実 行 者:　大谷將壽(衛星開発プロジェクト代表)

●目標金額:　100万円達成⇒ネクストゴール200万円に挑戦中

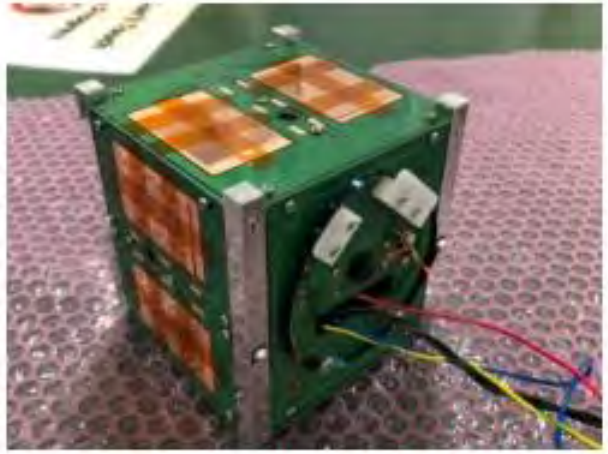
●**募集期間:　2019年8月23日(金)～2019年11月21日(木)**

●概　要:　九州工業大学「衛星開発プロジェクト」は、学部生が主体となって、ミッション決め、設計・開発・試験・通信・運営を行うプロジェクトです。2016年から開発を行っている超小型人工衛星「ふたば」の2021年度打上げを目指しています。

PHOTOS ARE ON THE NEXT PAGE

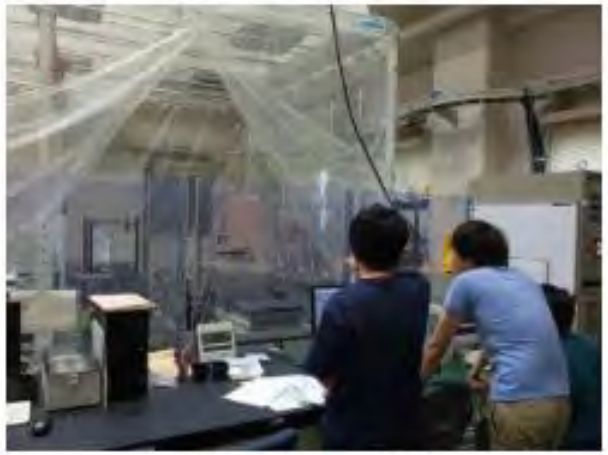
FULL INFO: https://www.kyutech.ac.jp/whats-new/topics/entry-6771.html

プロジェクトメンバー集合写真



EM(試作モデル)

作業の様子



EM(試作モデル)振動試験

EM(試作モデル)組み立て

新メンバーに技術を教える様子

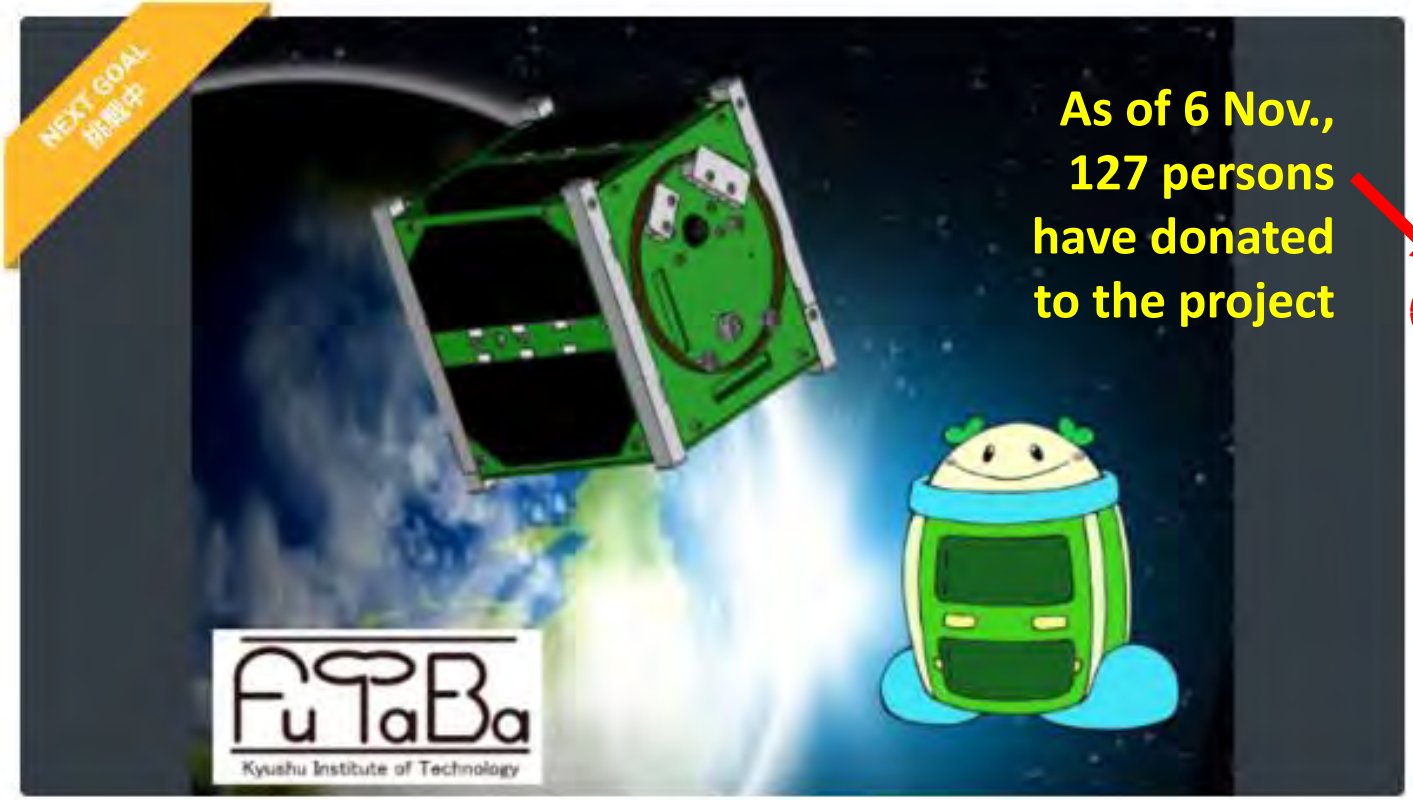
Futaba Satellite Project

寄附型 #福岡県 #チャレンジ #テクノロジ #寄附型 #学生のチャレンジ #大学 #研究

九工大から宇宙へ！超小型人工衛星「ふたば」！！

衛星開発プロジェクト 代表　大谷 將壽

Screen shot of 6 Nov. 2019



As of 6 Nov., 127 persons have donated to the project

寄附総額
1,592,000円
NEXTGOAL 2,000,000円 (第一目標金額 1,000,000円)
159%

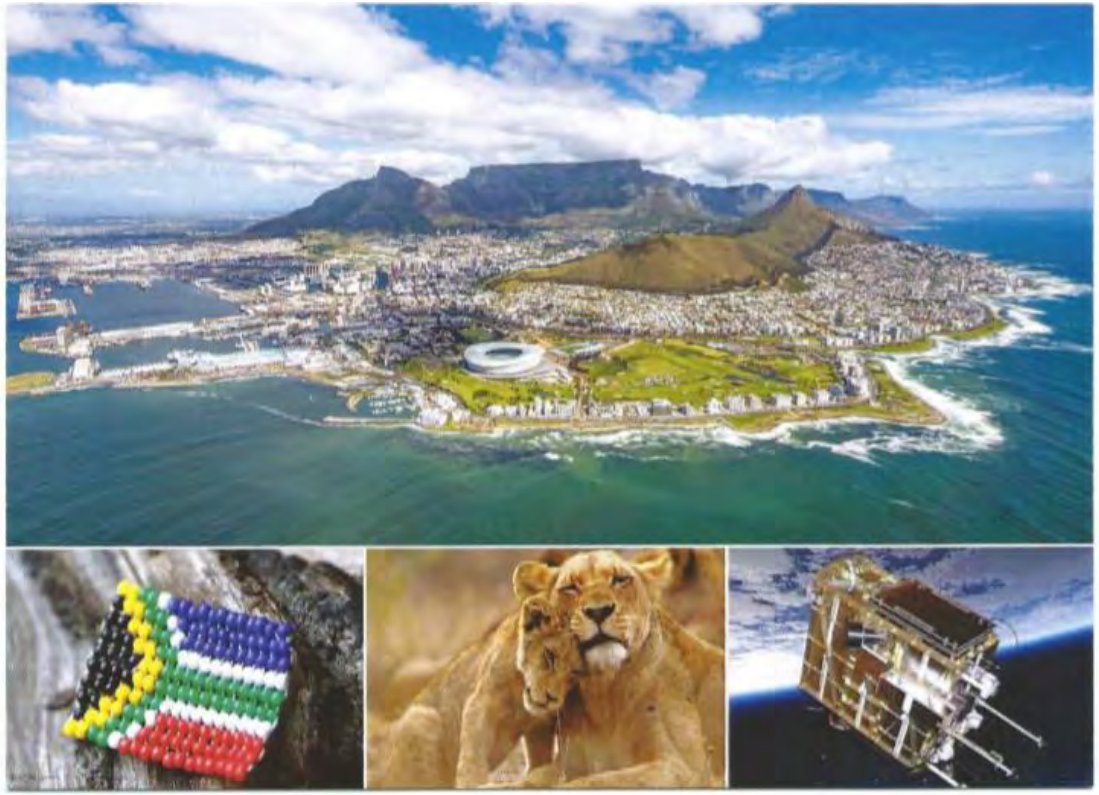
寄附者 127人
残り 15日

プロジェクトの寄附にすすむ
(※ログインが必要です)
20

目標金額を達成した場合のみ、実行者は集まった支援金を受け取ることができます(AllorNothing型)。支援募集は11月21日（木）午後11:00までです。

いいね！ ツイート LINEで送る

10. IAA African Symposium on Small Sats, 11-13 May 2020, South Africa



South Africa was distributing this postcard at IAC (2019; Washington, DC). If interested, mark your calendar ! ….Editor.

OLAYINKA'S WORLD

COLUMN NO 15

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

2019 INTERNATIONAL OBSERVE THE MOON NIGHT

The **International Observe the Moon Night** is an annual worldwide public event that encourages observation and appreciation of the Moon. Each year, thousands of people participate at museums, planetaria, schools, universities, observatories, parks, businesses, and backyards around the world.

International Observe the Moon Night is a worldwide celebration of lunar science and exploration held annually since 2010. One day each year, everyone on Earth is invited to observe and learn about the Moon together, and to celebrate the cultural and personal connections we all have with our nearest neighbour.

The event occurs in September or October, when the Moon is around first quarter. A first quarter Moon is visible in the afternoon and evening, a convenient time for most hosts and participants. Furthermore, the best lunar observing is typically along the dusk/dawn terminator, where shadows are the longest, rather than at full Moon.

The **2019 International Observe the Moon Night** was marked on Saturday, 5th October 2019. *The Astronomers Without Borders* (AWB) Nigeria was at the Novare Gateway Mall, Lugbe, Abuja where tens of weekend shoppers had the rare opportunity of observing the moon through telescopes. There were a lot of excited kids who had the privilege of observing the moon through a telescope for the first time. It was a very clear weather on the day and so the experience was quite great for a lot of them.

A cross section of shoppers having great time observing the moon with the telescopes

12. The best presentation of 2018 UN/IAF workshop in Bremen, Germany

UNITED NATIONS
OOSA

26th Workshop "Space Technology for Socio-Economic Benefits: "Industry, Innovation and Infrastructure for Development (3Is4D)"

28-30 September 2018, Bremen, Germany

Some of the workshop participants

GO HERE TO DOWNLOAD ANY PRESENTATION FROM THIS WORKSHOP:

https://www.unoosa.org/documents/pdf/psa/activities/2018/UN_IAF/IAF2018_Programme_final_with_presentations.pdf

Friday, 28 September 2018

	Centre for Satellite Technology Development
16:15	**The growing emergence of NewSpace in Africa** Lechandi De Witt NewSpace Systems
16:30	**Strengthening economic development in Africa through technological startup ecosystem support**

I thought this was the best presentation because of the clear message that was delivered, shown on the next page. This message is seldom heard but needs to be stated more often. I have travelled a lot on behalf of "New Space" in developing nations and this message is most certainly correct.

The presentation was given by a rep of NewSpace Systems (a private firm in South Africa)
http://www.newspacesystems.com/

SUMMARY : why *new space* matters

SHORTCOMING

Current government space programmes, especially in non-reliable sources of funding. This results in the non-industry and leads to:

1. The regression of the nascent capabilities and
2. A reduction in long-term **benefits to wider society & the technology to address pervasive social issues**

SOLUTION – a self-sustainable space industry

Nascent space faring nations should foster an environment commercially focused and thus more likely to result in tangible this approach the upstream developments will focus more downstream requirements.

Report from Sudan

By Sondos Wasfi, ISRA (Sudan)

http://www.isra.sd/about.php

ISRA Collaboration with UofK to Join BIRDS Ground Stations Network

The Institute of Space Research and Aerospace (ISRA) of Sudan has established collaboration with the Space Research Center (SRC) at the University of Khartoum (UofK), in order to incorporate the UofK CubeSat ground station into the BIRDS network.The arrangement stipulated that several researchers from ISRA would work at UofK ground station for receiving signals from BIRDS satellites fleet. In that context, on Saturday 2rd November researchers Eilaf Babai and Aalaa Babai from ISRA have presented a seminar that introduced BIRDS network to researchers in SRC. Afterwards, some of researchers from ISRA started a short training program at SRC under the supervision of Prof. Sharief Fadul the director of SRC, Dr. Nader Abdel Hameed the technical manager of SRC and Dr. Moutaman Mirghani the PM of ISRASAT1 project. The training objective is to train researchers on how to operate the station and to adjust it towards receiving the BIRDS satellites data.

Photo includes from left to right: Romisaa Ali, Eilaf and Aalaa Babai (twin), Moutaman Mirghani, Nader A. Hameed, Ahmed A. Kareem, Waleed Khalid and Hanadi.

Photos of ISRA researchers during the training with Dr. Nader Abdel Hameed.

Sudan Launches the 1st Sudanese Remote Sensing Satellite from China

Sudan has become one of the countries that own satellites by launching the remote sensing satellite, SUSAT-1. The Sudaneses satellite was launched earlier on Sunday 3rd November 2019 at 11:22 a.m. (Beijing Time), through Long March-4B rocket from the Taiyuan Satellite Launch Center in North China's Shanxi Province. SUSAT-1 was developed for the Sudanese government by the Shenzhen Aerospace Oriental Red Sea Satellite Co. The small satellite was designed to orbit at the altitude of 500 km in order to serve both civil and military Sudanese institutions and put a milestone in the Sudan space programme and space research fields. The main objectives of the project are to generate cost-effective and reliable database for the topograpy and mapping of Sudan, and assist in exploration and statistics of natural resources for proper developmental planning. Hence SUSAT-1 is expected to assist in environmental monitoring, agricultural, mining, desertification control, public homeland security and defence. One aim of the project is towards the localization of the space industry in Sudan and establishing ground facilities in the country. Data from SUSAT-1 and the control signals to the satellite will be through the national ground station, which was established years ago at Khartoum North. The ground station has been updated recently so as to be compatible to SUSAT-1.

Long March 4B Rocket

carrying SUSAT-1 Satellite

Source: https://africanews.space/sudan-has-launched-its-first-satellite-a-remote-sensing-satellite/

End of this report from Sudan

14. Guest lecturer discusses the latest X-ray research

Hard X-ray Emission from Accreting White Dwarfs (WD) in Binaries. Does it Affect The Work of Space Engineers?

Romanus Eze

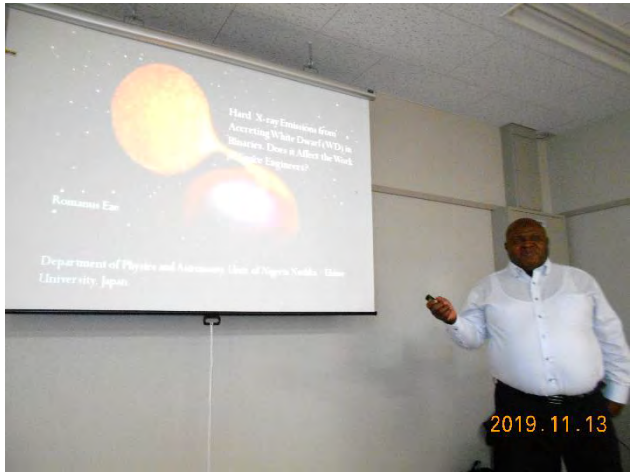
romanus.eze@unn.edu.ng

Department of Physics and Astronomy, University of Nigeria, Nsukka and Ehime University, Japan.

Abstract

I will be discussing what the space Engineers should know about the origin of hard X-ray emission from accreting white dwarfs in binaries, which are of two types: magnetic cataclysmic variables (mCVs) and symbiotic stars (SSs). How does these emissions and other violent explosions like the supernova events in the space affect the work of space Engineers. Also to be discussed are the emissions of Fe K_α lines from these compact objects and the use of these emission lines to probe the accretion flows in these objects. I will also discuss our recent findings on explanation of hitherto unknown source of the Galactic Ridge X-ray Emission (GRXE) using the Fe K_α lines from the white dwarf accreting binaries. Finally, I will discuss how we are using the knowledge of accretion disk in WD binaries to investigate the unusual behavior of the black hole X-ray binary, MAXIJ1535-571, which was indentified to have an anti-correlated hard/soft X-ray flux variation on a time scale of ~1 day around the outburst peak, which continued for ~10 days.

EHIME UNIVERSITY



University of Nigeria Nsukka

On 13 Nov 2019, Prof R. Eze gave a 40-min. seminar to the staff and students of Cho Lab at Kyutech.

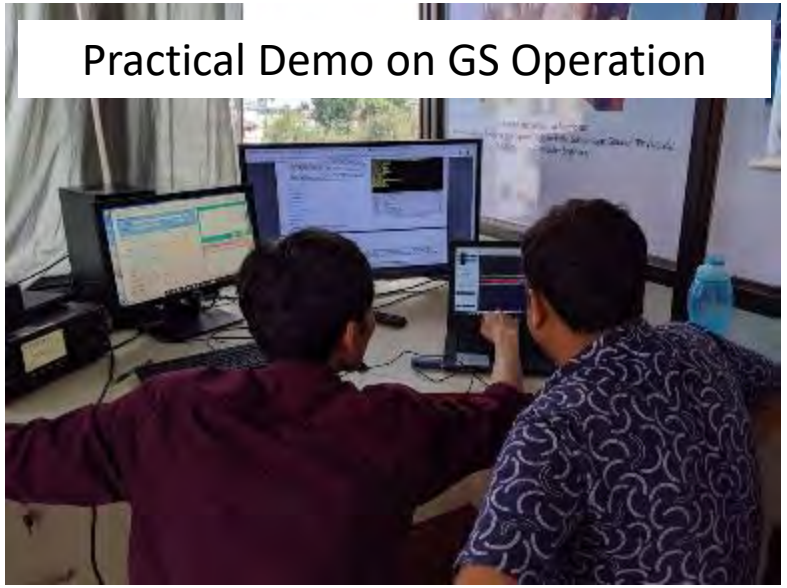
15. BIRDS-3: Apiwat and Abhas make a visit to Nepal

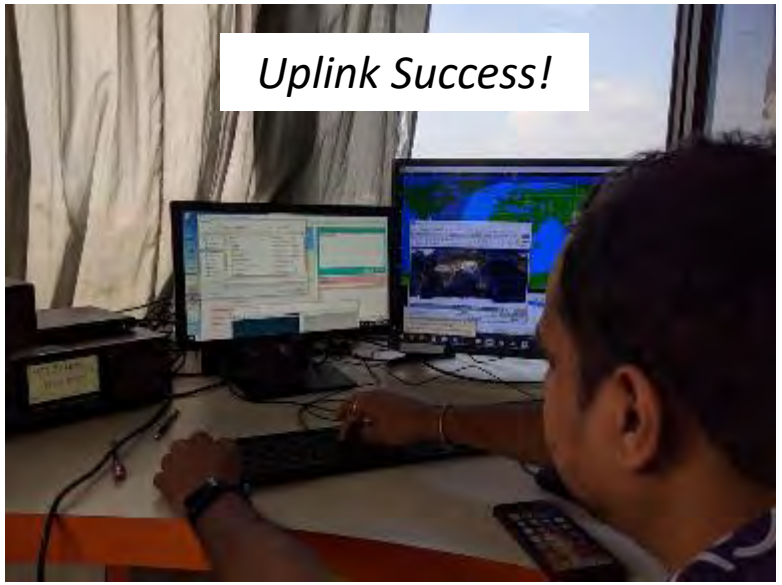
Apiwat and Abhas Visited Nepal during 18-26 Oct. 2019

A report by Abhas and Apiwat

11 Nov. 2019

NAST Ground Station Observation and Testing





9N1AA Satish Kharel Amateur Radio Meet and Talk

Discussion with NAST and ICOM vendor regarding future of NAST GS

Meeting and discussion with NAST VC Dr. Sunil Babu Shrestha

Meeting with Chief of Technology

Dr. Rabindra Dhakal will be attending 4BIW (4th BIRDS Int'l Workshop) in Dhaka this month

Meeting with Mr. Vishnu of ICOM

Mr. Vishnu is the sole distributor the ICOM radio brand in Nepal

NAST International Conference on Science, Technology and Innovation (21-23 October, 2019)

Liked by iamnischall and 165 others

anilkesharyshah Thrilled to speak at the International Youth Conference on Science and Technology organized by NAST. I am amazed at the innovations and inventions of our young scientists! Finally saw the NEPALISAT prototype, the same satellite that is orbiting the world sending photos back, among so many other incredible creations! Our young scientists are world class we all need to work to build the environment and ecosystem they need to excel in Nepal before they are forced to fly off into the world to realize their potential! Nabil Bank is proud to be a partner with NAST to recognize and reward our best scientific inventors and

Mr. Anil Shah is the CEO of Nabil Bank

Opening Ceremony of NAST Conference

Prime Minister delivers a speech

Vice President observes NepaliSat-1 replica

BIRDS and NepaliSat-1 Presentations at IYCSTI 2019

Apiwat presents about the BIRDS GS

Abhas of BIRDS-3 presents about the orbital status of NepaliSat-1

The three day event had numerous parallel sessions in place

Dibodh presents about NAST GS

Audience at one session

Interview with media personality Mr. Dil Bhusan Pathak on his show Tough Talk on Himalaya TV

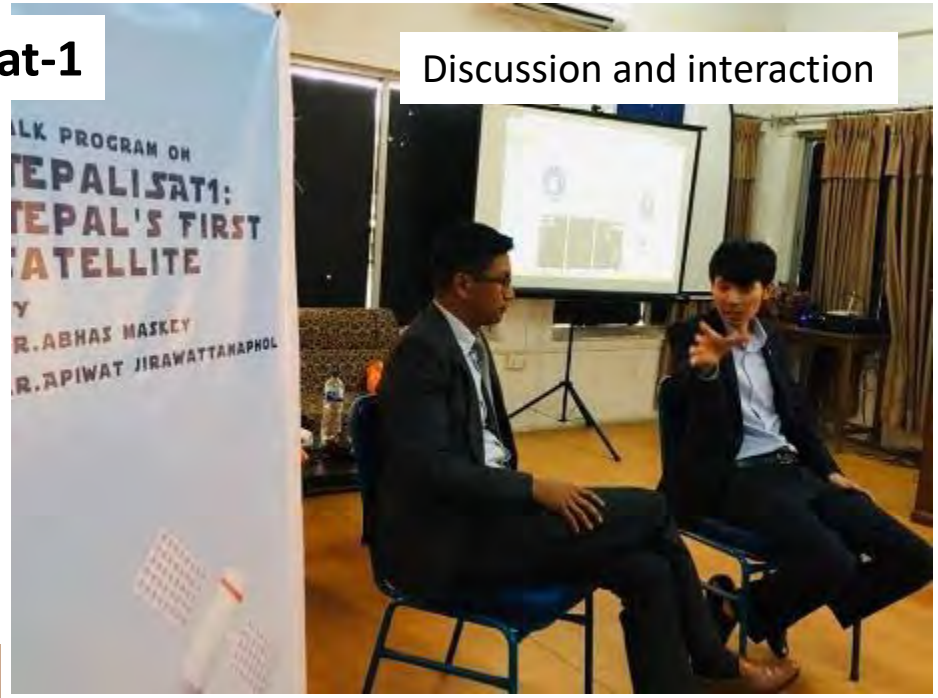
PART I https://youtu.be/VrffLBT2eBM 31.10.2019

PART II https://youtu.be/0jnGL9Ee9tc 07.11.2019

The interview explores the 14th 3-year plan by National Planning Commission, why collaborating with Kyutech made sense, NAST and government's involvement in BIRDS-3 and NepaliSat-1, operational status, debris mitigation, and remote sensing laws.

Youth Outreach for BIRDS and NepaliSat-1

Talk program about NepaliSat-1



Discussion and interaction

Interaction with youth at the conference

Apiwat presents about satellite facilities at Kyutech

We believe outreach of the work we do in Japan was important aspect of our trip in Nepal.

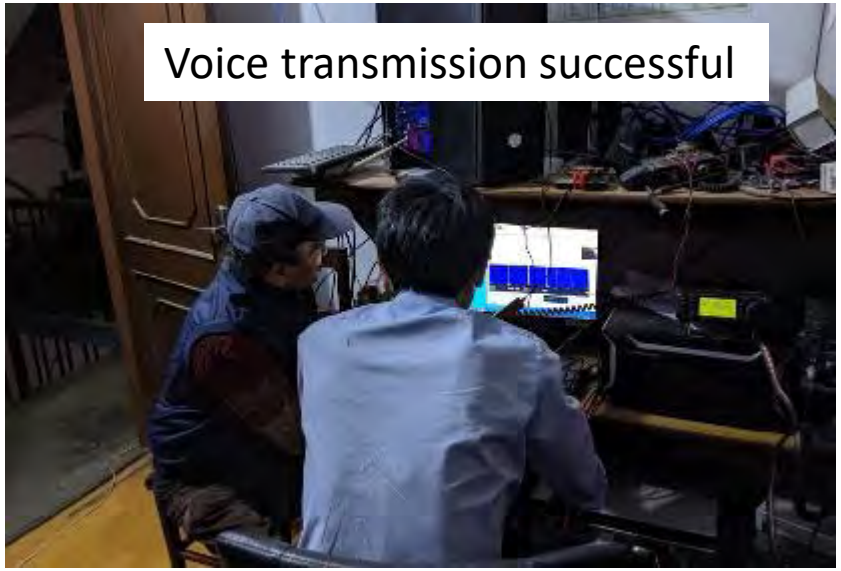
First installment of QO-100 GS at 9N1AA Satish Kharel's Shack + Interaction with Amateur community in Nepal


Antenna installation


QO-100 presentation


Amateur radio community


Antenna integration


Voice transmission successful

Nepalese Culture Exposure to Apiwat

#respectmomo

Liked by **hs0tk_ronarong** and **24 others**

pakpaopic Real Momo in Nepal
#respectmomo #nepal

OCTOBER 29

Streets of Kathmandu

Welcoming Apiwat

Swayambhunath Stupa

Local Newari Cuisine

Apiwat's Visit to Nepal

Roads of Lalitpur, near NAST

Apiwat receives token of appreciation from NAST

Apiwat interviewed by NAST's media crew. The interview will be aired on Nepal TV

End of report about the trip to Nepal

16. Report from the Philippines

STAMINA SPACE

UPDATES FROM THE PHILIPPINES

November 15, 2019

University of the Philippines-Diliman
Quezon City, Philippines

PREPARED BY:

Mae Ericka Jean C. Picar
STAMINA4Space Communications Officer, STeP-UP Project
Graphic Artist and Contributing Writer

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STAMINA4Space Communications Officer, PHL-50 Project
Contributing Writer and Editor

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STAMINA4Space Project Manager, STeP-UP Project
Contributing Writer and Editor

A glimpse of future possibilities

University of the Philippines Integrated School (UPIS) Immersion

October 15-16, 2019

University Laboratory for Small Satellites and Space Engineering Systems (ULyS^{3}ES)/PEDRO Center

Four students from the University of the Philippines Integrated School (UPIS) Senior High School underwent an immersion in the STAMINA4Space Program's STEP-UP Project on October 15-16, 2019. UPIS's Applied Science and Engineering Track Work Program aimed to provide a hands-on experience in conducting research and generating products to expose students to possible career tracks in the engineering and medical fields.

Photos during the UPIS students' immersion in the STeP-UP Project

A glimpse of future possibilities

Quezon Science High School (QSHS) Immersion

November 4-5, 2019

University Laboratory for Small Satellites and Space Engineering Systems (ULyS3ES)

Students from the Quezon Science High School also went through an immersion program as part of the Philippine Department of Education's Senior High School (SHS) Program. It aims for students to (i) gain relevant and practical industrial skills under the guidance of industry experts and workers; (ii) appreciate the importance and application of the principles and theories taught in school; (iii) enhance their technical knowledge and skills; (iv) enrich their skills in communications and human relations; and (v) develop good work habits, attitudes, appreciation, and respect for work. Exposing individuals to space-related technology and applications is one of the goals of the STeP-UP Project.

Photos during the QSHS students' immersion in the STeP-UP Project

STAMINA4Space researchers
Jara Villanueva and **RK Aranas**

NASA INTERNATIONAL SPACE APPS 2019 CHALLENGE

NASA Space Apps 2019:
NASA International SPACE Apps Challenge

October 18-20 , 2019

Two of our science research specialists joined the NASA Space Apps 2019 Stardust Station to represent the STAMINA4Space Program. Their booth titled **"Tracking Diwatas: An introduction to web APIs"** introduced the usage of external APIs and software packages into certain applications like making a tracker application for the Diwata satellites.

WHAT IS SPACE APPS?

Now in its 8th year, **Space Apps** is an international hackathon for coders, scientists, designers, storytellers, makers, builders, technologists, and other interested individuals in participating cities around the world. Here, teams engage with NASA's free and open data to address real-world problems on Earth and in space.

Read more here: https://www.spaceappschallenge.org/

STAMINA4SPACE PHL MICROSAT

ARUReady?

Diwata-2 Amateur Radio Unit (ARU) Demonstration and Workshop

November 08, 2019

University of the Philippines - Electrical and Electronics Engineering Institute (UP-EEEI)

The STeP-UP Project held a workshop for members of the **Philippine Navy** on November 08, 2019. The attendees included members from Philippine Marine Corps, Philippine fleet, Naval Sea Systems Command (NSSC), Naval Information and Communications Center (NICTC) and the Philippine Navy Headquarters.

Key topics and demos focused on Orbiting Satellites Carrying Amateur Radio (OSCAR), satellite tracking , antenna and wave propagation, and antenna development.

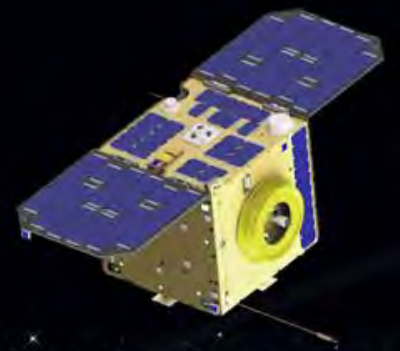
Diwata-2: A Year In Space

Diwata-2 marks anniversary with demo of localized technologies and applications

October 29, 2019

"Translating knowledge into local technologies and applications" was the chosen theme for the simple celebration marking the first anniversary of Diwata-2 in space, which was held at the University of the Philippines Diliman - Electrical and Electronics Engineering Institute (UP-EEEI) on October 29, 2019.

As a "science satellite" built in an academic environment, Diwata-2 is primarily intended to conduct scientific measurements and experiments for environmental assessment and monitoring, which can be carried out by its on-board cameras. In its first year in space, Diwata-2 has acquired images covering 46.06% of the Philippines, which are being distributed in the website http://www.phl-microsat.upd.edu.ph. Current registered users on the website have reached over 800, which span researchers, academic institutions, government, non-profit organizations, industry groups, and the general public.



Kumusta ka na,
Diwata-2 ?

IMAGES CAPTURED

13,800
Total number of images captured as of October 25, 2019

14,492
No. of images captured in the Philippines as of October 25, 2019

46.06%
of Philippine land area covered as of October 25, 2019

...that's like **3 times** the land area of Switzerland!

ALTITUDE

October 2019: **600 km**
that's like a stack of around **240 Mayon Volcanoes !**

VELOCITY

October 2019
7.55 km/s
It will take **3.15 seconds** to cover **EDSA** with that speed (assuming there's no traffic)!

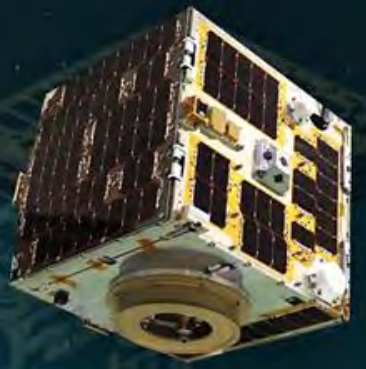
MISSIONS ACCOMPLISHED

1,250 MISSIONS AROUND THE WORLD

Altitude and velocity simulated using STK 11

Diwata-2: A Year In Space

Diwata-2 marks anniversary with demo of localized technologies and applications



In her opening message, DOST Undersecretary for Research and Development Dr. Rowena Guevara said, "The event's theme, 'Translating knowledge to local technologies and applications' captures what the team has been doing since then," and later added, "We hope to continue this momentum by fostering more local and international linkages and choosing more skilled and passionate researchers in this field in paving the way for future satellites, not only future Diwatas but possibly even more sophisticated satellites that bear the names of more Philippine icons that can proudly symbolize how far the Filipino stamp of ingenuity and innovation can take us."

Key messages delivered by (*clockwise from top*) UP-EEEI Director Director Dr. Michael Pedrasa, current DOST Undersecretary for Research and Development Dr. Rowena Guevara (middle) and former Undersecretary Dr. Amelia Guevara (rightmost), DOST-PCIEERD Executive Director Dr. Enrico Paringit, and STAMINA4Space PHL-50 Project Leader Dr. Marc Talampas.

Diwata-2: A Year In Space

Diwata-2 marks anniversary with demo of localized technologies and applications

Presenters of the morning program(left to right): STAMINA4Space Diwata-2 Project Manager and head of DOST-ASTI's Solutions and Services Engineering Division Embedded Systems Group **Engr. Gerwin Guba** on developing Diwata-2, STAMINA4Space OPTIKAL Project Chief Science Research Specialist **Dr. Atchong Hilario** on payload development and local partners, and STAMINA4Space STeP-UP Embedded Systems Engineer **Mary Ann Constante** on the Amateur Radio Satellite Station and satellite communications.

STAMINA4Space University Researcher **Shielo Namuco-Muta** giving a comprehensive overview of Diwata-2's status and operations during the morning program.

STAMINA4Space PHL-50 Project Leader Dr. Marc Talampas summarized the essence of the event in pertinent numbers: **13**, the number of satellites that are either in orbit, in the lab as engineering models, or under development nurtured by Filipino hands; **46.06%**, the percentage of Philippine land area Diwata-2 has captured; **672**, the number of screws that had to be checked after every vibration test during Diwata-2's development (an example of meticulous engineering rigor needed); **3**, the "trinity of vision" — light source, object, and detector (basic principles that Diwata-2's optical payloads operate under); and **101** — for Philippines-Oscar 101 (PO-101), which was designated by AMSAT to Diwata-2's ARU on April 11 this year.


STAMIN SPACE
PHL MICROSAT
Updates from
STEP-UP
scholars
"The seventh step..."
September 9, 2019
University of the Philippines- Diliman
Quezon City, Philippines
Prepared by STeP-UP scholars
Renzo S. Wee | Christy A. Raterta
Layout Designer/ Contributing Writer
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Judiel L. Reyes
Contributing Writer
Bryan R. Custodio
Project Manager
Contributing Writer
Gladys A. Bajaro
Contributing Writer
Marielle M. Gregorio
Contributing Writer

Satellite EM Assembly and Tests

Marielle M. Gregorio

The first Engineering Model (EM), as well as the spare parts and components of the soon-to-be locally developed nanosatellite arrived at ULyS^{3}ES-1, EEEI, UP-Diliman on October 28, 2019.

After the inventory of items were received, the EM was assembled and programmed using the codes of Maya.

Solar panel boards were taken from Maya 1.0 EM

First Antenna Deployment execution trial set in 32 minutes

Picture of Antenna before deployment (above) and after deployment (below)

Happy Natal Day!

Christy A. Raterta

A birthday blast on October 14 at Yakimix, SM North with the scholars, Joven, and Keziah..

To Engr. Marielle M. Gregorio, wishing you the happiest 33rd birthday!

May you always be a BELLAmazing and ABBIErilliant woman! May the father Almighty bless you with a finger-HERLIJKing-good life filled with happy memories, wonderful moments, and shining dreams.

TRIVIA:
Abie, Bella and Herljick are names of Engr. Gregorio's most favorite and loved people. Engr. Gregorio is married to a naval officer, HERLIJK, and blessed with 2 cute kids, Bella Amor (Bella) and Althea Beatriz (Abbie).

END OF REPORT FROM THE PHILIPPINES

17. N6RFM receives his call sign from BIRDS-3

Email from N6RFM (Bob Mattaliano): *… I just received from* **Uguisu** *on 16Oct2019 1350Z telemetry and again several times on 17 October with my call sign being sent. So happy to hear it! Please thank the entire BIRDS-3 team on my behalf for this special kindness. I was delighted.*

Bob with replica of Lilacsat-1

His antennas for satellite work (see the text at the right)

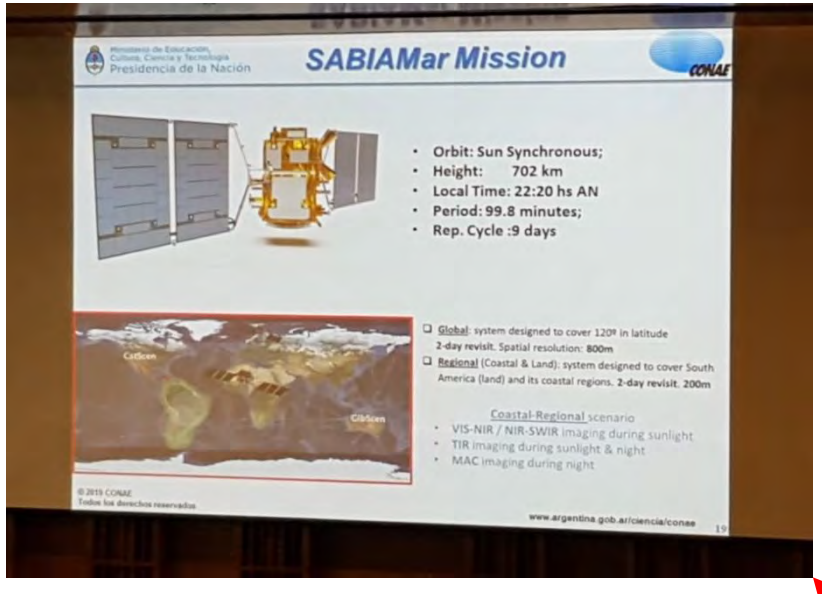
Since childhood, I have been very interested in radio reception and electronics. In 1988, I received my amateur call N6RFM (Extra Class). Over the years, my primary interests have included shortwave radio reception, amateur radio on HF and working DX stations and contesting. Since 2015, I have also turned my attention to amateur satellites, satellite telemetry reception, and GNU radio running under Linux based operating systems. Currently, my satellite station includes an Icom IC-910H, and Airspy R2 and Lime SDR mini SDRs.
The antennas are custom made from Arrow antenna, with 4 elements on 2 meters and 10 elements of 70 cm, in a crossed configuration.
Polarity may be changed with switches from SSB Electronics. The 70 cm preamp is also SSB Electronics. The 2M preamp is from Icom.
I have a Ph.D. in Biochemistry and am a semi-retired R&D executive, with a long career in Biotechnology based drug development. Currently, I am working in the field of lung cancer diagnostics.

My wife and I moved to Rhode Island in 2016.

-- Bob Mattaliano

18. 2nd IAA Latin American Symposium On Small Satellites

by Sankgyun Kim, 16 Nov. 2019



1. Objective of document

This document reports the activities of 2nd IAA Latin American Symposium On Small satellites. Interesting topics are selected for this document.

2. Date and Venue of Symposium

Dates : 2018/NOV/11 – 2018/NOV/16
Venue : Buenos Aires, Argentina

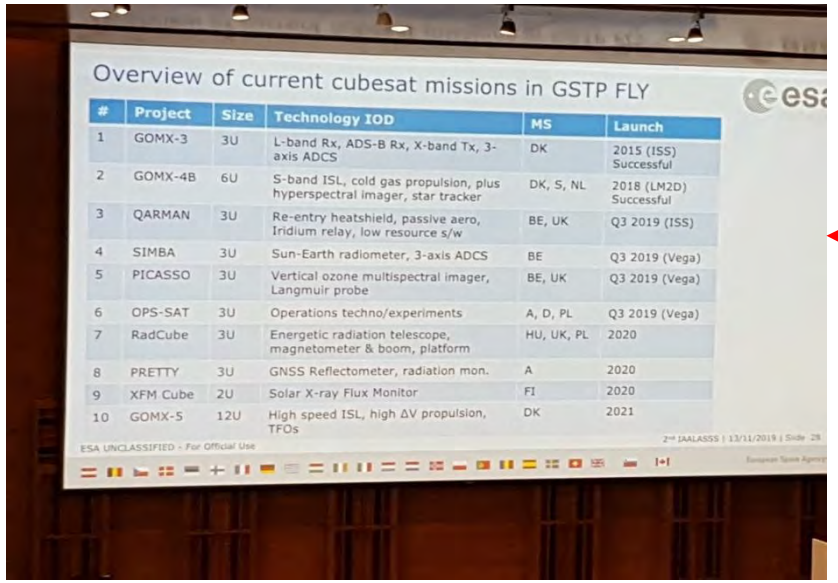
3. Presentations of Symposium

a. Activities of organizations

- CONAE(Space agency of Argentina)

- ☐ T.Tabanera Space Center : Satellites development
- ☐ Pipinas-Capetinas Space Center : Rocket development
- ☐ SABIAMar satellite is under development for the ocean color monitoring
- ☐ New rocket is under development, test launch is scheduled in 2025. But, not such solid schedule
- ☐ After Symposium some people visits Bariloche, because INVAP (NT space of Argentina) is there

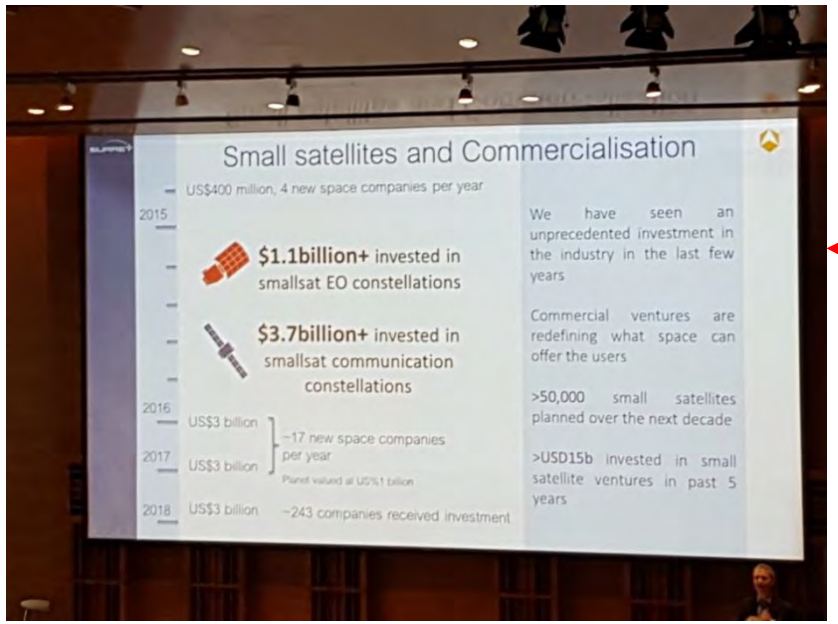
- AEB (Brazilian Space agency)
- 200 people are working in AEB
- AEB is small agency, but has deep interest in small satellites development
- Multi mission platform is under development, name of AMAZONIA
- Amazonia-1 is under test in INPE, and will be launched by PSLV in 2020
- Science mission satellite is also under development for the atmosphere monitoring, EQUARS satellite
- AEB is serious for CubeSat because it gives big opportunity



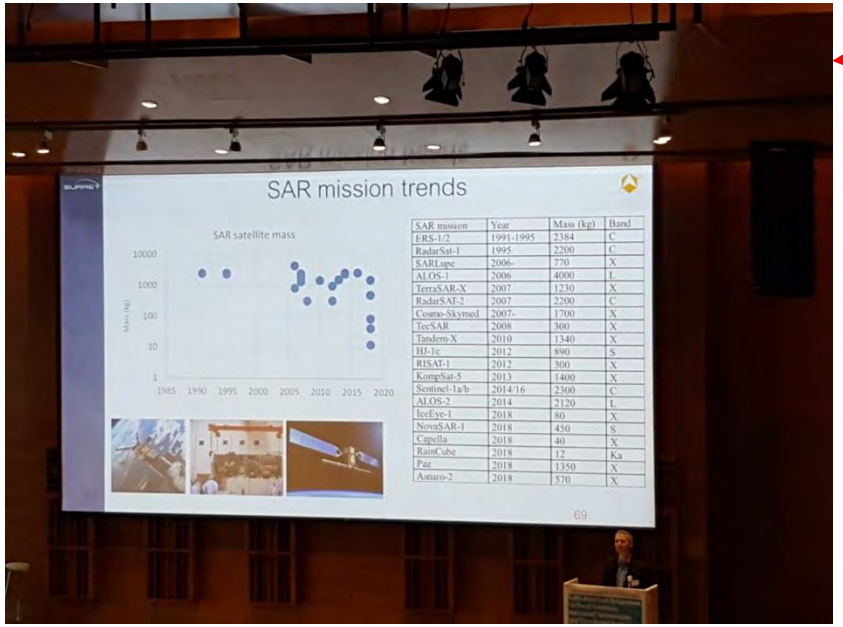
- NASA presents their projects, but no big difference with other conferences

- ESA presents their activities for small satellites. ESA want to say they supports many chances for CubeSat programs.

b. Projects introductions



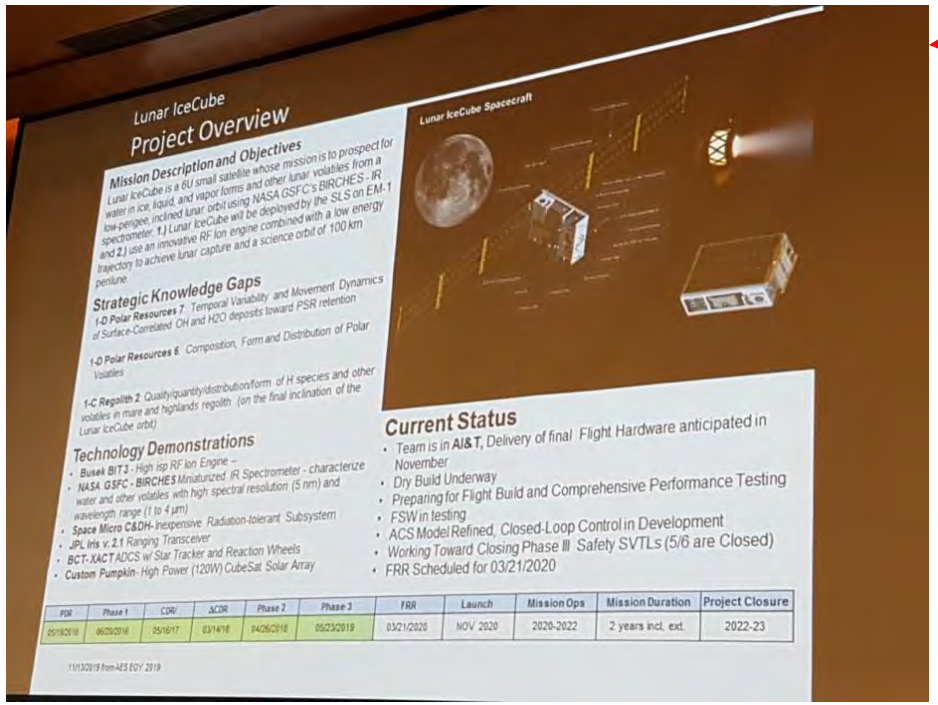
- Surrey presents current booming and their projects for small satellites
  - 70% of launched spacecraft are small satellites now, year of 2018
  - However, for the cost of space program around world, big satellites (heavier than 250kg) have share of almost half, about 400million USD. Small satellites can take more share, and huge investments are coming to small satellites industry, especially for the constellation service.



- Surrey is trying to cover all remote sensing satellites including small SAR satellites, and aiming to rapid revisit constellation service with all sensors

- INPE of Brazil presents NANOSATC-BR2 (2U CubeSat) satellite for their plan of CubeSat constellation. Main missions are attitude determination, Langmuir probe, S&F

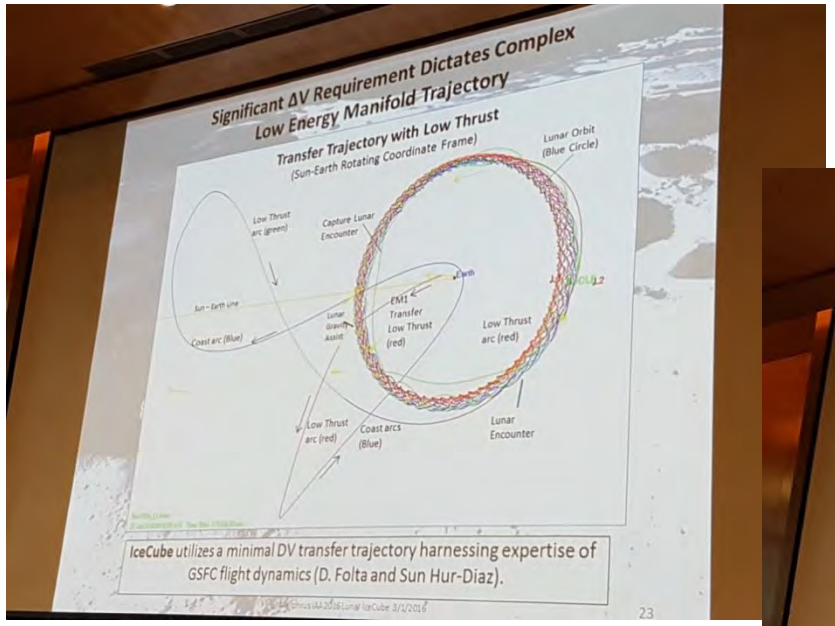
- Institute Antarctica Argentina presents their project of Antarctica glacier monitoring. Basically, it is data gathering project from remote data terminal on Antarctica. Still it is on plan.

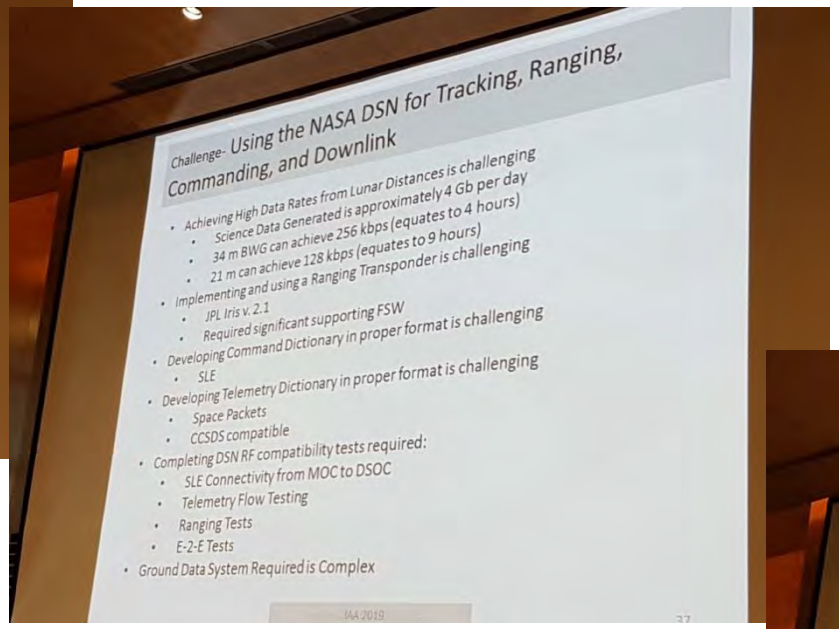


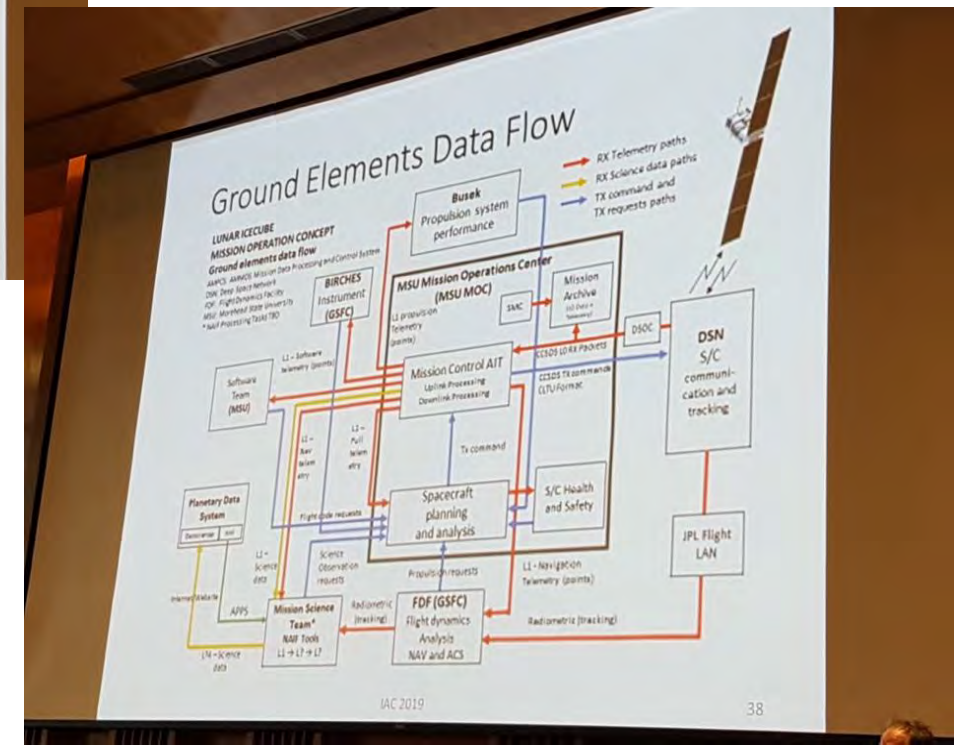
MORE RELATED PHOTOS ON THE NEXT PAGE

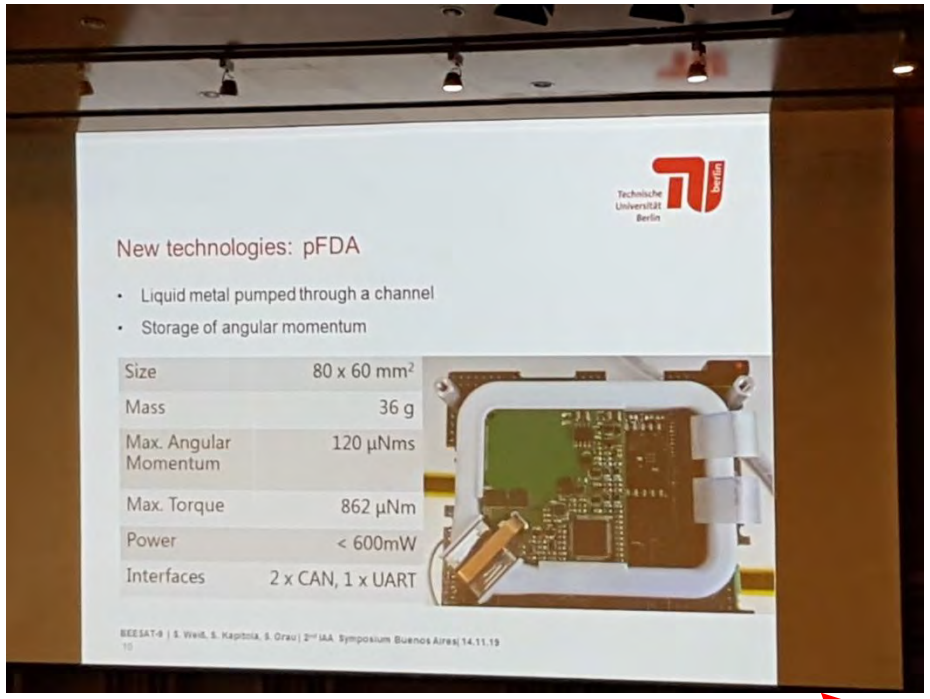
- CONAE has joint project of CubeSat development with University of Rome. Very similar to AOBA VELOX-IV project.

- Morehead State University (USA) presents their project of LUNAR ICECUBE. It uses Artemis-1 program
  - ☐ 24 million USD budget for the project
  - ☐ Many partners work together :
    - ➢ Morehead State University Space Science Center
    - ➢ The Busek Company (Propulsion)
    - ➢ NASA Goddard Space Flight Center
    - ➢ NASA JPL
  - ☐ Use RF ion engine to enter lunar orbit (100km altitude)
  - ☐ ICECUBE use minimum dV with complex trajectory scheduling, it takes 6 months to enter lunar orbit
  - ☐ Use NASA DSN for ranging service
  - ☐ Ground station system is complex to support deep space project using NASA's facilities


Significant ΔV Requirement Dictates Complex Low Energy Manifold Trajectory
Transfer Trajectory with Low Thrust
(Sun-Earth Rotating Coordinate Frame)
Lunar Orbit (Blue Circle)
Low Thrust arc (green)
Capture Lunar Encounter
Earth
Sun – Earth Line
Lunar Gravity Assist
EM1 Transfer Low Thrust (red)
Low Thrust arc (red)
Coast arc (Blue)
Low Thrust arc (red)
Coast arcs (Blue)
Lunar Encounter
IceCube utilizes a minimal DV transfer trajectory harnessing expertise of GSFC flight dynamics (D. Folta and Sun Hur-Diaz).
23


Challenge- Using the NASA DSN for Tracking, Ranging, Commanding, and Downlink
Achieving High Data Rates from Lunar Distances is challenging
Science Data Generated is approximately 4 Gb per day
34 m BWG can achieve 256 kbps (equates to 4 hours)
21 m can achieve 128 kbps (equates to 9 hours)
Implementing and using a Ranging Transponder is challenging
JPL Iris v. 2.1
Required significant supporting FSW
Developing Command Dictionary in proper format is challenging
SLE
Developing Telemetry Dictionary in proper format is challenging
Space Packets
CCSDS compatible
Completing DSN RF compatibility tests required:
SLE Connectivity from MOC to DSOC
Telemetry Flow Testing
Ranging Tests
E-2-E Tests
Ground Data System Required is Complex
IAA 2019
37


Ground Elements Data Flow
RX Telemetry paths
RX Science data paths
TX command and TX requests paths
LUNAR ICECUBE
MISSION OPERATION CONCEPT
Ground elements data flow
Busek
Propulsion system performance
BIRCHES Instrument (GSFC)
MSU Mission Operations Center (MSU MOC)
Mission Archive
DSOC
DSN S/C communi-cation and tracking
Mission Control AIT
Uplink Processing
Downlink Processing
Software Team (MSU)
Spacecraft planning and analysis
S/C Health and Safety
Planetary Data System
JPL Flight LAN
Mission Science Team*
NAIF Tools
FDF (GSFC)
Flight dynamics Analysis
NAV and ACS
IAC 2019
38



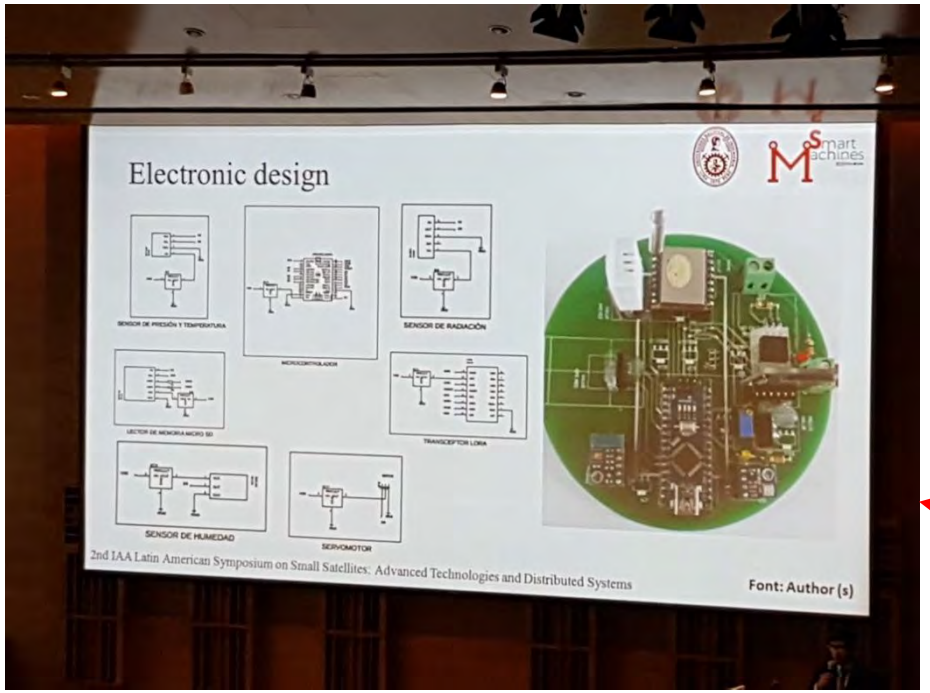
- Space BD presents their business model. Now their business is strongly tied with ISS, but they are going to announce conventional rocket launch service next month

- Nanoracks also presents their business model, with various deploy pods.

- PUCP of Peru presents many researches for PocketQube. PocketQube is the idea of Professor Bob Twigg, and he moved to Morehead State University now. PUCP works with Professor Bob Twigg for this PocketQube

c. Technical presentations

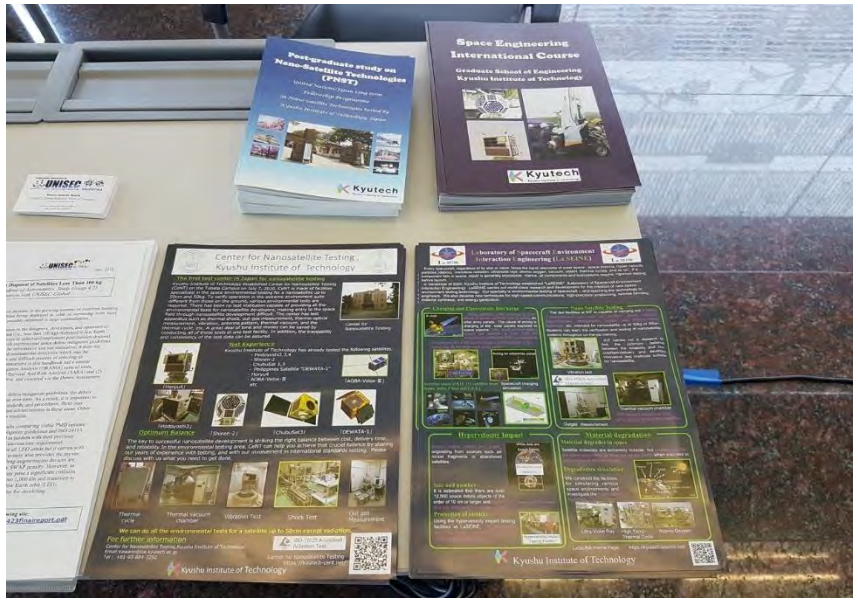
- TU Berlin suggest liquid metal pump for the actuator of attitude control for their BeeSat-9. Become more practical compare to the presentation of APRSAF



- INVAP, CONAE present their haradware in the loop simulator

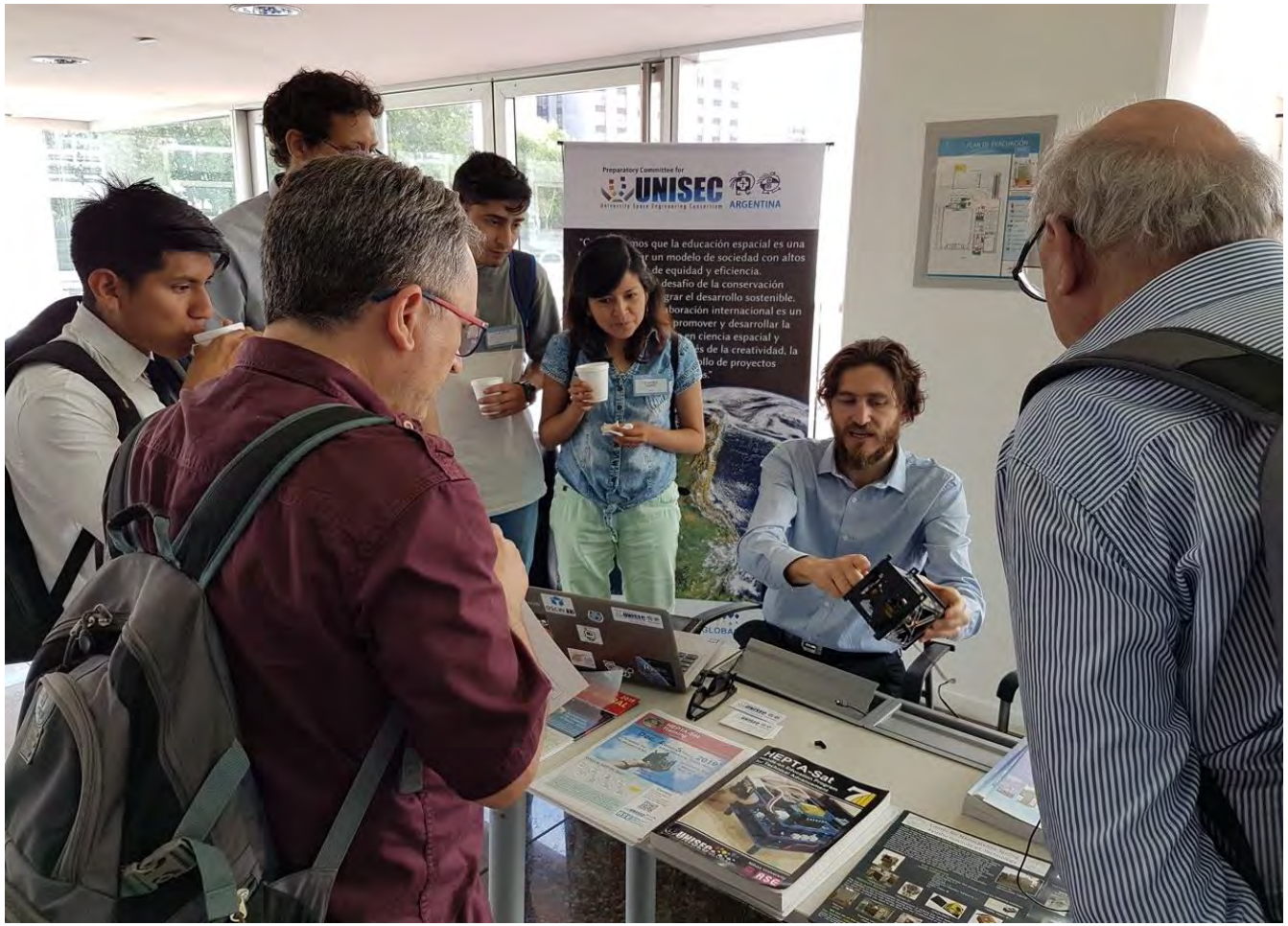
- Many universities present their research, many of them is thesis of students.

- Now, CanSat program become very popular for the educational outreach activity in Latin America. Many universities present their CanSat programs. Some CanSat design follows standard of ESA, and some CanSat design is very similar with the CanSat kit of UNISEC naturally.



4. UNISEC Global booth

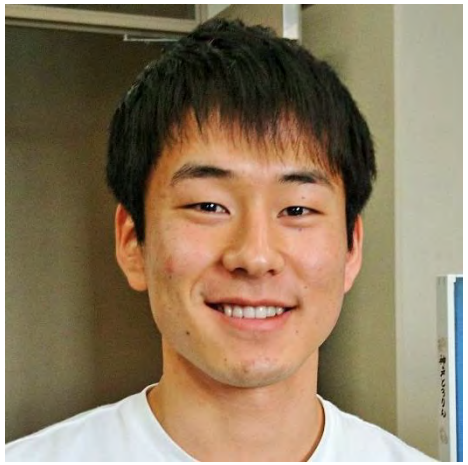
Brochures of laboratory are distributed on the table of UNISEC global booth.



END OF THIS REPORT OF IAA LATIN AMERICA SYMPOSIUM ON SMALL SATS

Space Activity Act

of Japan



Tomoaki MURASE

07 November, 2019

Space Activity Act

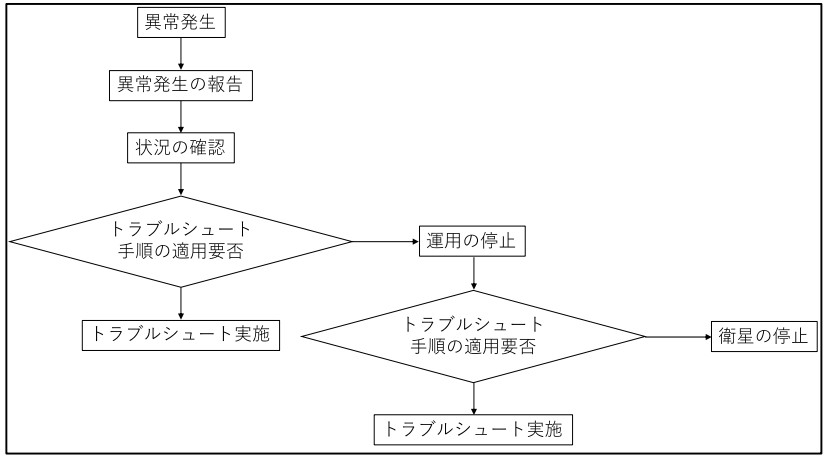
Written By: Tomoaki MURASE

We should submit papers concerning satellites activity in space to the Japanese government, because we need to ensure the safety of our satellites and their operation.

For instance, when rocket is lunched by a company, they must get approval from the Japanese government. That is because they should prove the rocket is safe enough to lunch and will never crash. Of course, when they didn't get the approval of safety during the space activity, they cannot launch. In short, it is the space law. In the same way, that kind documents are needed when the satellite is going to be launched. Satellite flies in the sky and operate in space. It also would be dangerous to fly in the sky and operate in space without safety proof.

The documents is called "Space Activity Act" document. As the background, the act concerning "Space Activity" come into force on 15 November 2018 in Japan. Space Activity Act covers milestones of launch safety, satellite management and liability of the satellite. The act has three points. The first point is about safety related to launch. When launching, we should think "is the launch path safe?", "is the operational route in space safe?". Second point is about operation and management of satellite. When operating, we should think about "Where is ground station the satellite is controlled ?", "Will satellites produce harmful substances in pace?", "Is it safe when re-enter the atmosphere". Final point is liability.

I've written the documents for our satellite. Information about vibration test, antenna deployment test, the safety of EPS, ground station, operations, the safety of reentering and fundamental knowledge about the project. It was hard for me to write them, but I've got a lot of helping from our team and managed to finish them on time.

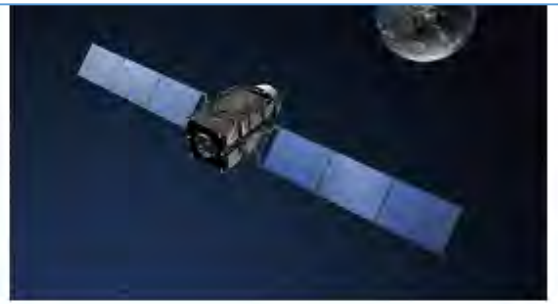


Flow chart when an abnormality is discovered

Editor's Note

See also the **Space Policy** webpage of Japan's Cabinet Office:
https://www8.cao.go.jp/space/english/index-e.html

and effectuating operations of industries, lifestyle and administration of public organizations. It also serves for the greater presence of Japan in the Asia-Pacific region by providing regional positioning service and for the national security, in terms of strengthening cooperation between Japan and the US. QZSS will also improve disaster management capabilities.



(JAXA)

Space Exploitation Prize

The award of this prize is intended to express appreciation to cases which contribute to the advancement and promotion of space development and use, such as those who made remarkable achievements or leading efforts in the space development. The award will enhance recognition and understanding of the public on the need for promoting space exploitation.

Page top

Cabinet Office

Organizations (Only in Japanese)

- Strategic Headquarters for National Space Policy
- Committee on National Space Policy
- National Space Policy Secretariat

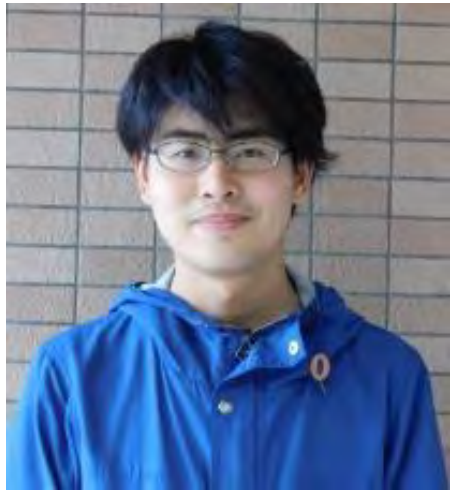
Remort Sensing Data Act

- Application for Remote Sensing Data Act

Space Activity Act

- Application for Space

ITU Document Submission Schedule (API)



Daisuke Nakayama

November 04, 2019

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

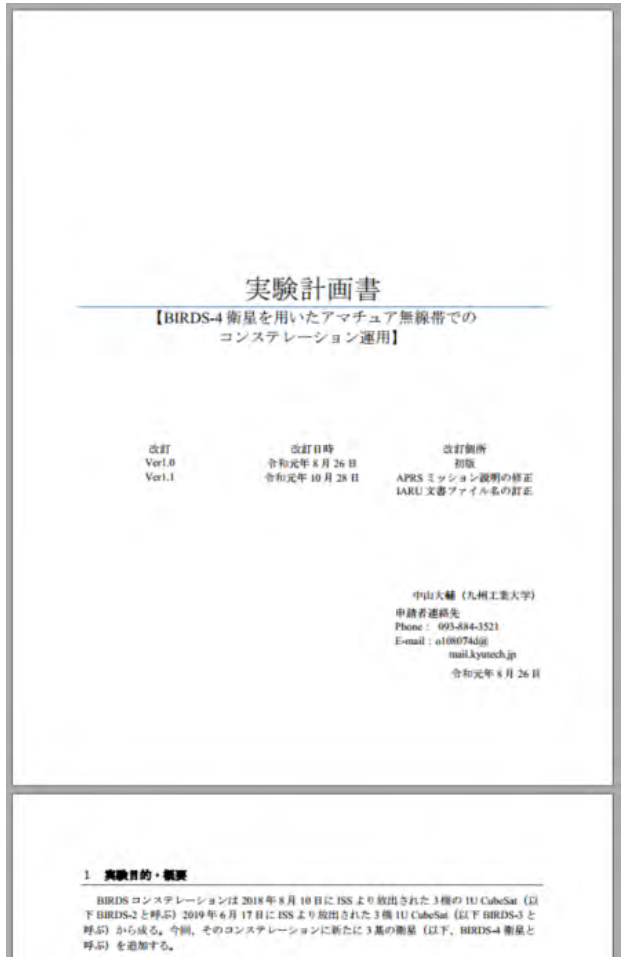
ITU Document Submission Schedule (API)

Written By: Daisuke Nakayama

We got frequency license for BIRDS-4 assigned from IARU on September. We made a document regarding to our experiments for “Ministry of Internal Affairs and Communications”. This organization issue domestic licenses but they are also responsible for submitting API[*1] to the ITU[*2] for international frequency coordination. They submit API based on our experiment document.

We already submitted to ITU our experiment document. We are waiting for our API to be published by ITU.

*1 Advance Publication Information
*2 International Telecommunication Union



実験計画書

【BIRDS-4 衛星を用いたアマチュア無線帯での
コンステレーション運用】

改訂	改訂日時	改訂個所
Ver1.0	令和元年 8 月 26 日	初版
Ver1.1	令和元年 10 月 28 日	APRS ミッション説明の修正 IARU 文書ファイル名の訂正

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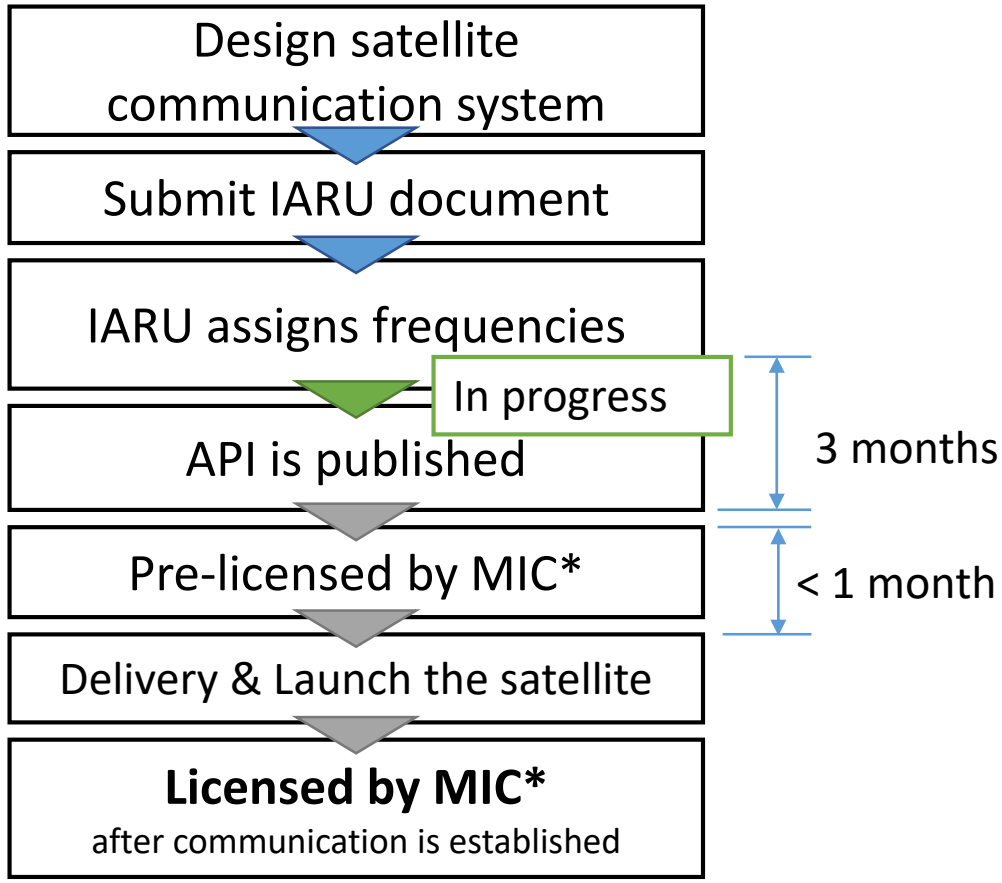
令和元年 8 月 26 日

1 実験目的・概要

BIRDS コンステレーションは 2018 年 8 月 10 日に ISS より放出された 3 機の 1U CubeSat（以下 BIRDS-3 と呼ぶ）2019 年 6 月 17 日に ISS より放出された 3 機 1U CubeSat（以下 BIRDS-3 と呼ぶ）から成る。今回、そのコンステレーションに新たに 3 基の衛星（以下、BIRDS-4 衛星と呼ぶ）を追加する。

Our experiment document ~constellation operations in amateur radio band using BIRDS-4 satellite~



Flow chart of frequency coordination for an amateur radio satellite

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

Thermal Vacuum Test on BIRDS-4

Anibal MENDOZA

09 November, 2019

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

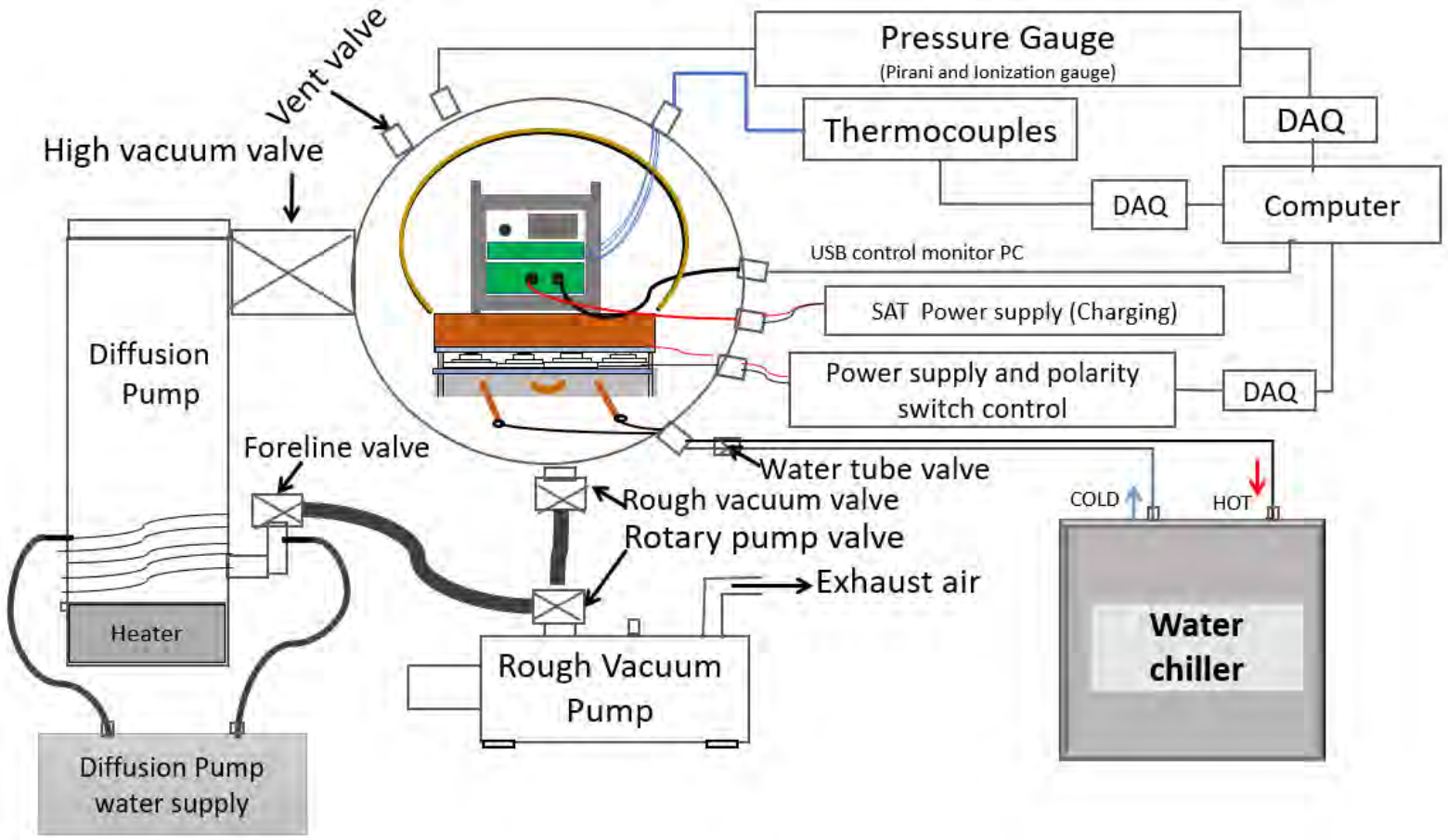
Thermal Vacuum Test on BIRDS-4

Written By: Anibal MENDOZA

It is very important to make sure that the satellite is going to be fully functional in orbit. One of the tests that is a "must-do" to satellites during its development is the thermal vacuum test.

The thermal vacuum test consists of operational tests on the satellite by trying to imitate the harsh environment of space.

This environment includes the vacuum that goes below 0.001 Pascals (High Vacuum) and thermal cycling to extreme hot and cold conditions that varies depending on which orbit or where the satellite is going to be, in our case, BIRDS4 is going to be on LEO environment so the temperature range goes between (-20 to 60 degrees Celsius).

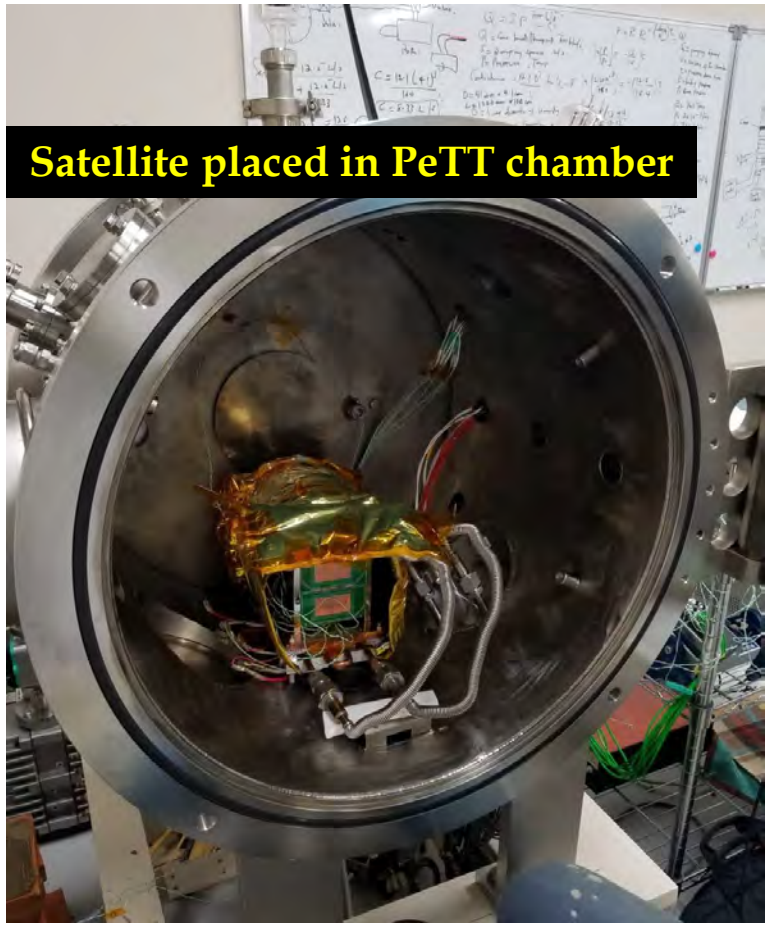


Schematic Diagram of PeTT Vacuum Chamber, of the Center of Nanosatellite Testing, Kyutech

*This PeTT vacuum chamber was developed by **Benjamin Bonsu**, who is a Ph.D. student and member of BIRDS project*

Thermal Vacuum Test on BIRDS-4

Written By: Anibal MENDOZA



Satellite placed in PeTT chamber

This PeTT vacuum chamber was developed by Benjamin Bonsu, who is a Ph.D.student, and is a member of the BIRDS Project.

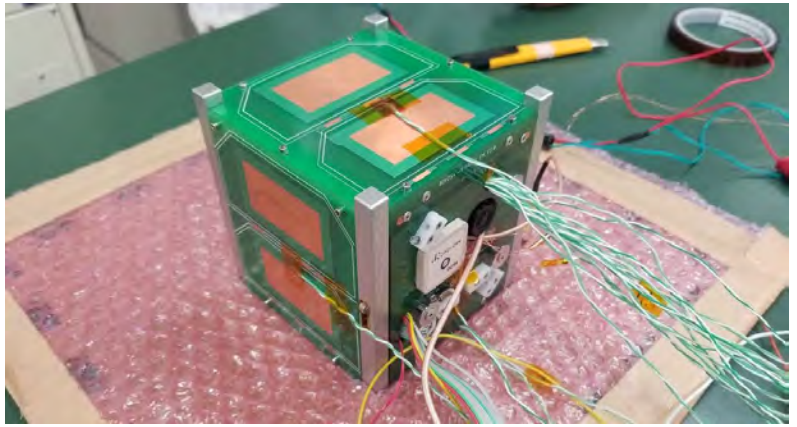
TVT Purposes:

- **Checking functionality and operation of the satellite under defined temperature range (extremely hot, extremely cold and moderate temperature conditions)**

Like any other test, TVT requires a procedure to follow. To make the procedure the team must define what is going to be tested during the functional test (internal components of the satellite), which vacuum chamber is going to be used and what ports are available to reach the satellite.

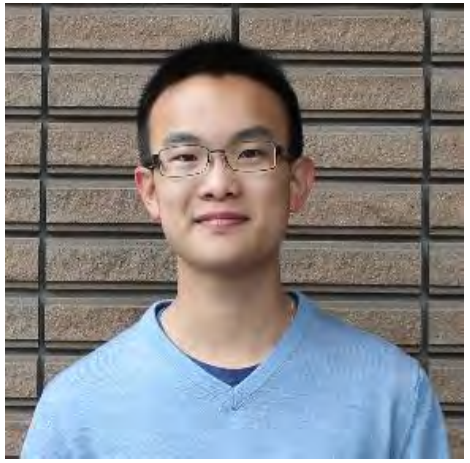
- **Measuring temperatures at different satellite points under extreme hot and cold conditions**

Normally, satellite's PCBs/components have build-in thermal sensors to measure the temperatures in different points, but in order to confirm these sensors' measurements, thermocouples (TCs) are attached in all these points inside and outside of the satellite, thus making it possible to compare between both readings and to confirm the accuracy of the internal sensors.



BIRDS4-EM with TCs attached

Yuma’s Birthday Celebration



Timothy Ivan LEONG

November 11, 2019

BIRDS-4

JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Yuma's Birthday Celebration

Written By: Timothy Ivan LEONG

On October 14th we celebrated Yuma's birthday as it is now tradition in BIRDS-4. Yuma's birthday is on October 13th but he wasn't available when we wanted to celebrate it that day so we had to postpone it on the day after.

This time we ate a chocolate cake. We didn't had any candle to put on the cake so we had to improvise this time with a candle application from a smartphone. We had a lot of fun during this little pause before returning to work.

Yuma with the cake and our improvised candle

A small party for Yuma

Private Space-Business Opportunities

Yasir ABBAS

BIRDS-4

November 07, 2019

BIRDS-4

JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Private space-business opportunities

Written By: Yasir ABBAS

Introduction:

Space activities started as early as the 40s of the last century. Most of people know about the first satellite in 1957, and the first human in space 1961. The new information to many is that the space activities started in the 40s by sending rockets that are capable of entering space by the Germans.

Since that time the space filed was dominated by the governmental entities, they start projects, they do researches and experiments and they invest money!

In this article we will explore some areas where private companies are spending or able to spend their precious money!

[source]

Telecommunication:

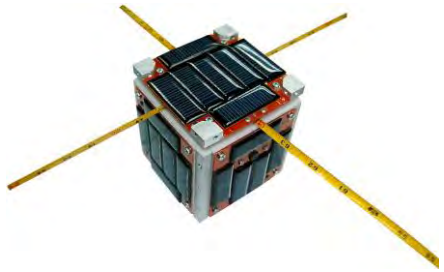
As early as 1965 the first commercial satellite ever launched was providing telecommunication services.

And since then telecommunication is the main service that private companies invest in.

Subsystem Development:

Satellite industry has been standardized. Specially the small satellite industry. The bus system of the satellites usually is not dependent of the mission. The missions needs some requirement, if the bus can provide them it doesn't have to be developed by the same team as the mission designers.

Based on this logic, subsystem companies were established to provide ready boards to satellite project developers.



[source]

Private space-business opportunities

Written By: Yasir ABBAS

Launching Services:
As the cost of the launch is reduced per kg, and because of the increased number of small satellite projects many companies found an opportunity in providing private launching services to

[source]

Training and Capacity Building:
The space related sciences became business opportunity. Many institutes train their engineers, managers and lawyers in academic universities of space agencies. Recently some companies established providing these trainings privately.

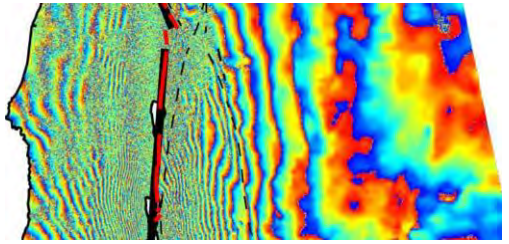
Broadcasting:

Private TV and radio producers overcame the boarders issues by using GEO satellite to broadcast their signals.

Space Tourism:
This is a hot topic in the space investors, many are trying to send tourists into space privately.
The first space tourist visited ISS in 2001. yet the first private company for space tourism is announced this year 2019.

[source]

Remote Sensing Application:
The remote sensing technologies have improved so much in resent years, the satellites usually send raw data that needs interpretation to change it from data to useful information. This is what the applications do. Companies can make a fortune from by providing these services to the public.



[source]

Conclusion:
Space sector is so virgin, many business chances that will definitely reword who steps up first!

BIRDS-4
FM Satellites' Logo Design

Yuma Nozaki

November 07, 2019

BIRDS4 FM Satellites

Written By: Yuma Nozaki

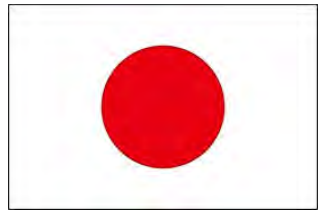
BIRDS-4

JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

MAYA-2

GUARANI-1

TSURU



BIRDS4 FM Logo of MAYA-2

Written By: Yuma Nozaki

The Philippines' Satellite "MAYA-2"

[source]

The Philippines's Department of Science and Technology (abbreviated as **DOST**)

[source]

University of the Philippines Diliman (abbreviated as **UPD**)
Izrael belongs to this university.

[source]

MAPUA university
Marloun belongs to this university.

[source]

Adamson university
Mark belongs to this university.

BIRDS4 FM Logo of GUARANI-1

Written By: Yuma Nozaki

Paraguay's satellite "GUARANISAT-1"

AGENCIA ESPACIAL DEL PARAGUAY

[source]

Agencia Espacial del Paraguay (AEP) is Space agency of Paraguay.

GUARANISAT-1 is going to be the first satellite of Paraguay.

[source]

Facultad Politecnica UNA

[source]

Centro para El Desarrollo de la Investigation Cientifica (CEDIC)

[source]

Universidad Nacional de Asuncion (UNA)

BIRDS4 FM Logo of TSURU

Written By: Yuma Nozaki

Japan's Satellite "TSURU"

Kyutech
Kyushu Institute of Technology
[source]

KYUSHU INSTITUTE OF TECHNOLOGY
1907
[source]

Kyushu Institute of Technology (Kyutech)

Hisatsugu, Nakayama, Murase and Nozaki belong to this university.

The purpose of BIRDS project is to develop and operate satellite by Kyutech students and international students.

The left figure is the school emblem called "Horyu" that is designed by Takeo Nakayama.

This is the emblem of "Meiji-sennmon-gakko"
(the predecessor of Kyutech)

Testing of Transceiver For SF-Ward Ground Terminal

Hoda El-Megharbel

November 08, 2019

BIRDS-4
JOINT GLOBAL MULTI-NATION BIRDS SATELLITE PROJECT

Introduction to SF-Ward Mission for BIRDS-4

Written By: Hoda Awny El-Megharbel

Store-and-Forward is one of the important missions for BIRDS-4 satellite project stakeholders; the main requirement of the mission is to have an operational Store-and-forward functionality for data collection from remote areas in both Philippines and Paraguay as well as Japan. The danger to lives caused by Chagas disease in Paraguay and Weather calamities in the Philippines presents the need for scientists to forecast these events using remote sensors located in far areas not reached by terrestrial networks this represents the importance of the success of this mission to collect data in each country using satellite technology.

The mission is designed to operate using three terminals; the BIRDS-4…

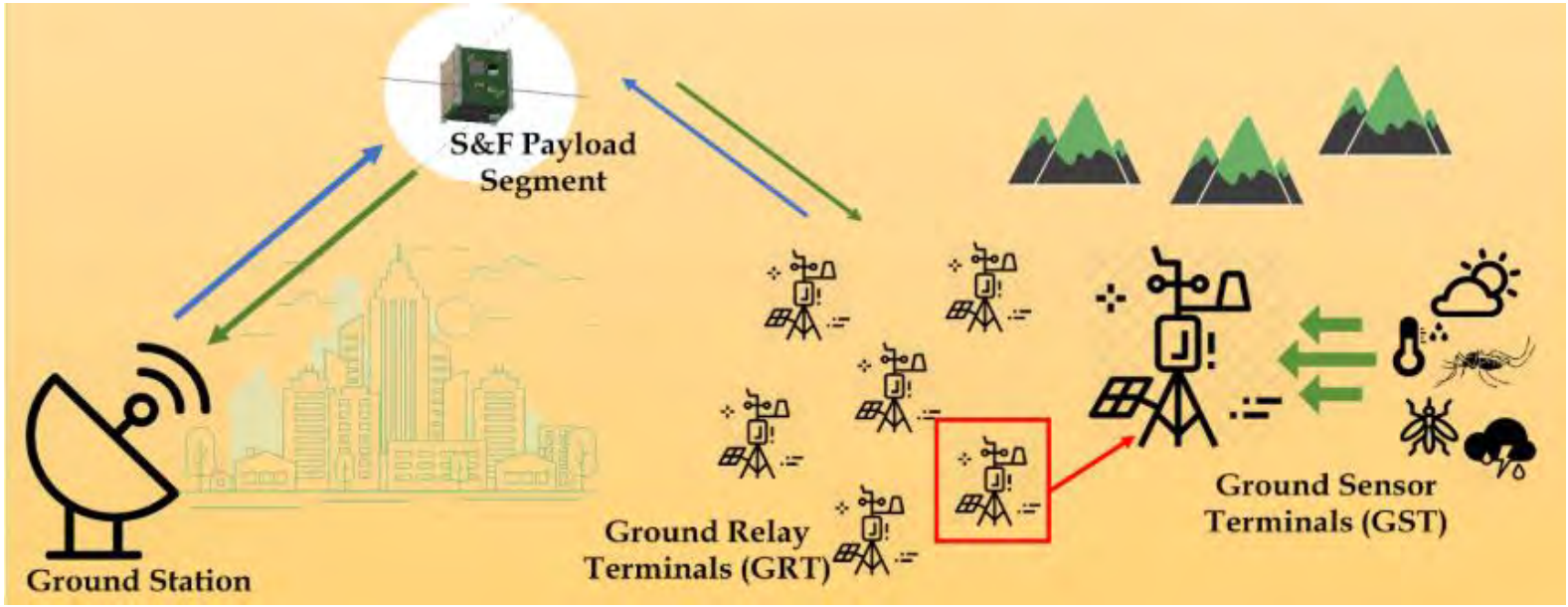


Fig.1: SF-Ward mission operation

…constellation, BIRDS ground station network and ground sensors terminal.

As shown in Fig.1, the ground sensor terminal should collect data from sensors in each country and uplink…

…them to the satellites during passing over each ground terminal and downlink the data back to one of BIRDS ground station.

Transceiver settings

Written By: Hoda Awny El-Megharbel

The ground terminal consists of a transceiver, a Raspberry-pi computer and an omni-directional antenna.

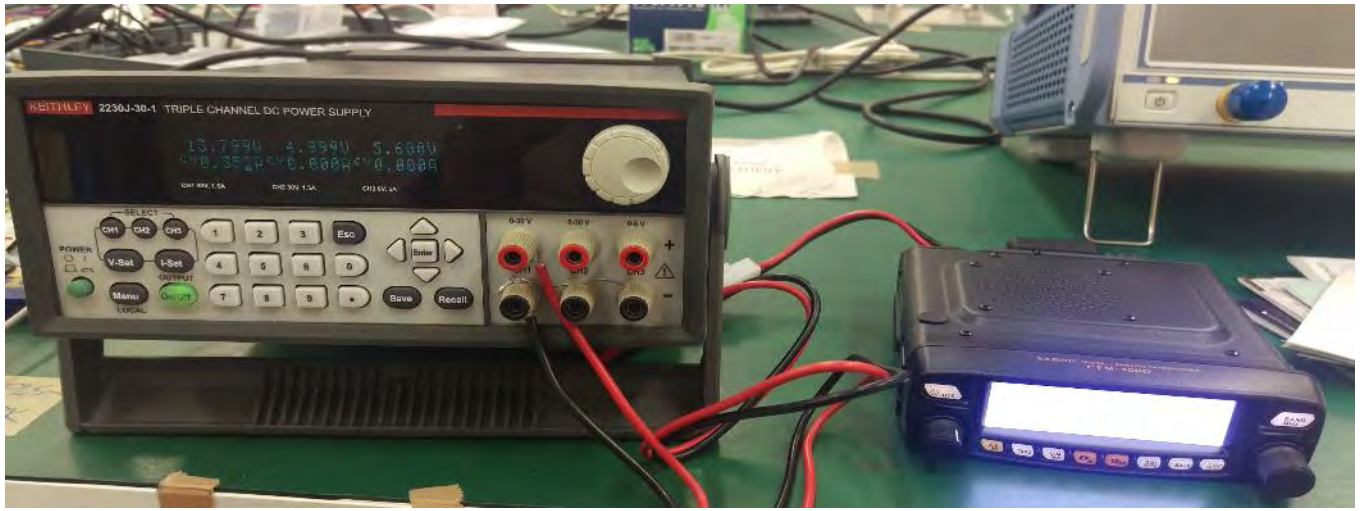
The Transceiver used is FTM-100 which is a VHF/UHF dual band transceiver with a high RF power output, built-in GPS and APRS capability.

The raspberry-pi will control the operation of the transceiver as well as the prediction of satellite passes and collecting data from the ground sensors.

After receiving the transceiver, basic setup settings were performed to prepare for the testing with the satellite payload and the long range test to confirm the link budget calculations.

Setting the VHF Frequency

Setting the call sign



Connecting the transceiver to power supply in BIRDS room

26. Recent Kyutech publications for the public

To access the links of this page, please go to here:
http://www.kyutech.ac.jp/information/publication.html#04

Kyushu Institute of Technology(英文パンフレット)

九州工業大学の概要を英語で紹介したパンフレットです。

内容を見る(全ページ:12MB)

← This is a 17-page brochure about Kyutech, written in English, updated for 2019-2020

九工大通信

「九工大通信」は、父母・保護者の方々や卒業生就職先企業等を対象に発行している広報誌です。巻頭特集をはじめ、活躍する卒業生・注目の学生活動・大学の新しい取り組みなどを紹介、就職状況などの情報も掲載しています。<

九工大通信 最新号 **← This is the Oct.2019 issue of the Kyutech Times**

Vol.54(2019.10.1号)

バックナンバー

Vol.17(2003.7.1号)～ Vol.53(2019.4.1号)

End of this **BIRDS Project Newsletter**

(ISSN 2433-8818)

Issue Number Forty-Six

This newsletter is archived at the BIRDS Project website:
http://birds1.birds-project.com/newsletter.html

When a new issue is entered in to the archive, an email message is sent out over a mailing list maintained by the Editor (G. Maeda, Kyutech). If you wish to be on this mailing list, or know persons who might be interested in getting notification of issue releases, please let me know.

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