



BIRDS Project Newsletter

Issue No. 11 (18 Dec. 2016)



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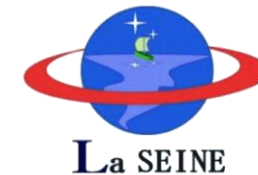


Members of BIRDS-1 and BIRDS-2 Teams (Tobata Campus)



Azami and Syazana (shown above) arrived on the 1st of December.

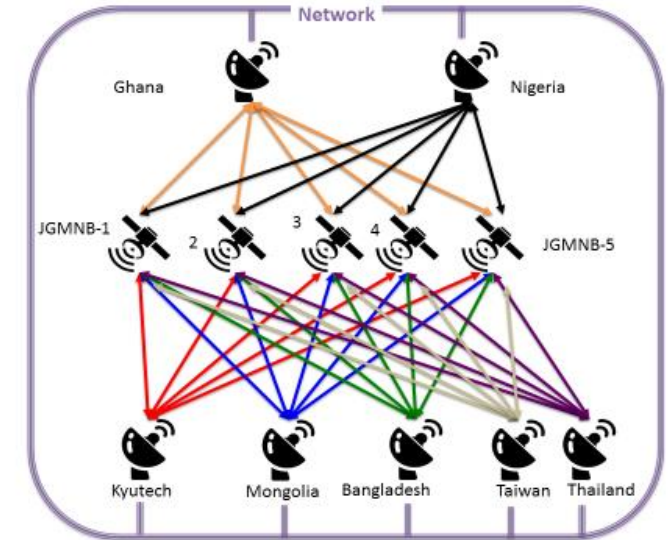
Project website: <http://birds.ele.kyutech.ac.jp/>
All back issues are archived at this website.



All back issues of this newsletter can be easily downloaded. Go to here: <http://birds.ele.kyutech.ac.jp/>
At the top, click on the tab called NEWSLETTER. You will get a menu for all back issues.

Contents of this Issue

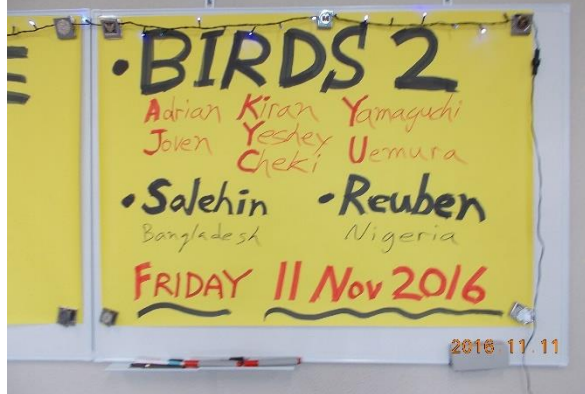
1. BIRDS Ice breaker Lunch
2. BIRDS covered extensively at 2016 APRSAF through three presentations
3. BIRDS participates in Kyutech Student Festival (55th工大祭)
4. Profile of Reuben Jikeme Umunna – new member of the BIRDS-1 Team
5. The work of Salehin Kibria in the BIRDS Project
6. Blank
7. Introducing Mr Mainbayar Altansukh of Mongolia
8. Milestones of frequency coordination for BIRDS
9. BIRDS-3
10. The Mongolian team, plus two visitors from Mongolia
11. Deadline reminder for 2017 PNST applications
12. Introducing Prof. Duger Ulam-Orgikh of Mongolia
13. Management of ANU (Ghana) visits KMUTNB (Thailand)
14. Each team undergoes rigorous practice for solar panel attachment
15. BIRDS engineers do ground operation practice with actual HORYU-4 passes
16. Azami and Syazana (both UiTM of Malaysia) join BIRDS-2 Team
17. Full-discharge-and-recovery test on the batteries
18. Introducing Prof. Mohammad Tariqul Islam
19. BIRDS-2 students sit amateur radio license exam



BIRDS-1 satellites and ground stations

1. BIRDS Ice breaker Lunch

11 Nov. 2016



At this lunch, the new BIRDS-2 members had a chance to chat with the veterans (BIRDS-1 members)

We welcomed the following:

- BIRDS-2: Adrian, Joven, Kiran, Yeshey, Cheki, Yamaguchi, Uemura.
- Visitor from UKM-Malaysia: Mr Salehin.
- New member of the BIRDS-1 Team: Mr Reuben of Nigeria.

Green salad →



Check out "Getting to Know You" (The King and I より) <https://www.youtube.com/watch?v=Vlx6gQWfjp0>



Salehin
Bangladesh

Reuben
Nigeria



Tokunaga
Japan

Nakamura
Japan



Ibukun
Nigeria

Apiwat
Thailand

Yamaguchi
Japan

Uemura
Japan



Maisun
Bangladesh

Taiwo
Nigeria

Dr Kim
Korea



Yeshey
Bhutan

Ward-san
Japan

Tsukinari-san
Japan



Maisun
Bangladesh

Nakamura
Japan



Cheki
Bhutan

Kiran
Bhutan



Prof Cho
Bangladesh

Antara
Bangladesh

2. BIRDS covered extensively at 2016 APRSAF via 3 presentations



Kyutech had a booth throughout the duration of APRSAF in Manila. It received well over 115 visitors. One of the visitors was JAXA's Astronaut Wakata; here he is holding a mock-up of **BIRDS-1**.

APRSAF is held annually. It is hosted by a nation of the Asia Pacific Region. It is funded by the host and by JAXA, so that there is an open forum where space agencies in this region can come together for four days to exchange notes, announce results, make new plans, and so on. Host next year: India.



G. Maeda delivered three different (but all related to BIRDS) presentations during APRSAF. At left, during Space Technology Working Group on Nov. 15th. At right, during ERIA Forum on Nov. 18th.



3. BIRDS participates in Kyutech Student Festival (55th工大祭)

工大祭は毎年11月下旬に開催される九州工業大学の学園祭です。
This student event occurs each year sometime in November.



This year it
took place on
19th and 20th
of November.



The food stall by the Bangladesh BIRDS Team (Antara, Maisun, Kafi, and Salehin)

2016_工大祭



工

大

祭

Food ... and passion



The food stall by the Nigerian BIRDS Team (Taiwo, Ibukun, and Reuben)

Food at Kyutech 2016_工大祭



Reuben

Taiwo

Ibukun

4. Profile of Reuben – new member of the BIRDS-1 Team



My Name is: Reuben Jikeme Umunna

My Country is: Nigeria

My Major is: Mechanical and Control Engineering

Assembly, Integration & Testing System Engineering Support.

My role is to support the assembly, integration and testing of BIRDS at the system engineering level in consistency with lean satellite development principles - timeliness and reliability.

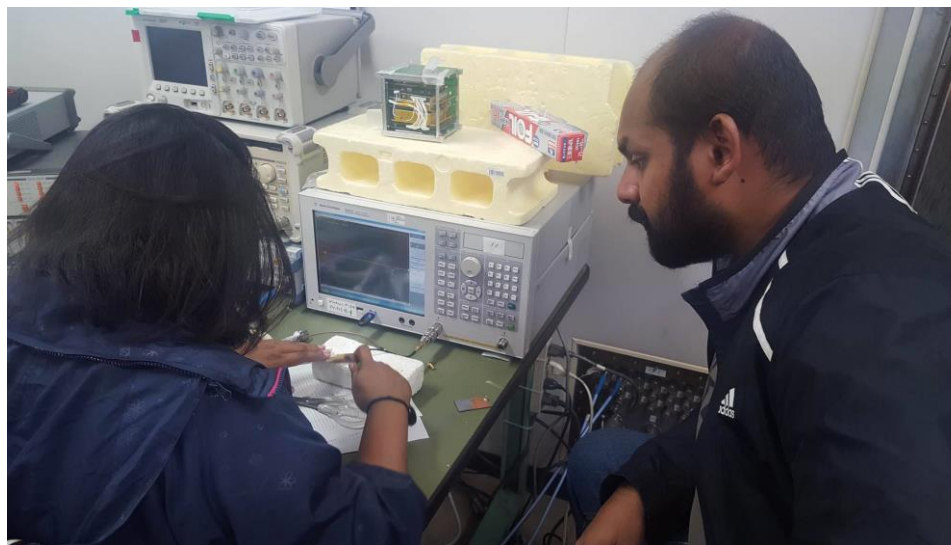
I hold a Bachelor of engineering - Mechanical, and a master in Aerospace Engineering from University of Benin, Nigeria and University of Salford, England respectively. I was involved in the development of NigeriaSat-2 and NigeriaSat-X, and as part of my task, I designed a cold gas resist-o-jet thruster, engaged in component level tests, system assembly, integration and tests of the propulsion modules. I hope to bring my experience and also learn from the contrasting underlying principles in the assembly, integration and testing of different satellite classes.

5. The work of Salehin Kibria in the BIRDS Project



About me: I am Salehin Kibria. My nationality is Bangladeshi. Currently, I am pursuing Ph.D. in Electronics, Electrical and Systems Engineering at Universiti Kebangsaan Malaysia (UKM). My research interests include RF systems, Planar antenna designs and Heuristic optimization techniques. It is a great honor for me to work on the BIRDS project alongside some brilliant minds from all around the world. My task in the BIRDS project is to design and implement the compact UHF and VHF patch antennas in the very limited area available on the 1U cubesat surface.

The image on the right shows us modifying the UHF patch antenna design to optimize its performance. The measurements were conducted using a Vector Network Analyzer (VNA).



This page and the next page were written by Salehin on 25 Nov 2016.



The images on the left were taken inside the Anechoic Chamber at Kyutech. We were measuring the radiation patterns of both UHF and VHF patch antennas. We tested the effects of the satellite body on the performance of the patch antennas. The Antennas Under Test (AUTs) we attached to the BIRDS satellite and placed on styrofoam block and rotated around to measure the variation of RF power in different orientations. The styrofoam block is used because it has similar electrical properties as air in microwave (RF) frequency range.

The image on the right shows the VHF patch antenna attached to the satellite body









7. Introducing Mr Mainbayar Altansukh of Mongolia

Full name: Mainbayar ALTANSUKH

Nick name: Aagi

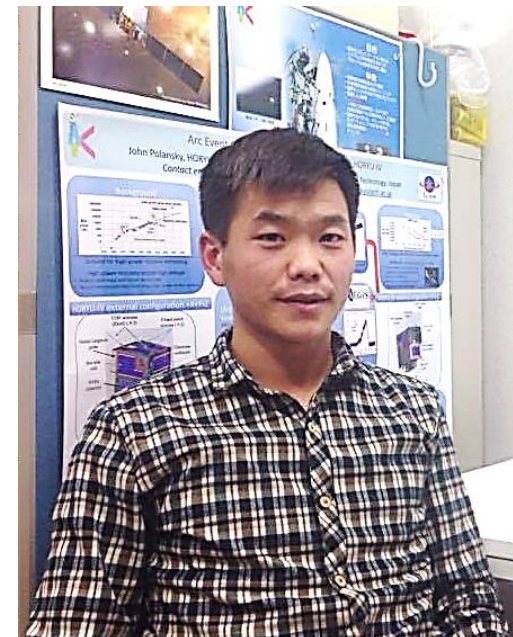
History: TA at National University of Mongolia

Background: Mechatronics and Electronics

Duration of stay at Kyutech: Nov 25~Dec 09, 2016

Purpose of stay:

- To study for operational and technical principles of BIRDS ground station
- To get knowledge of installation and remounting of ground station
- To get ground station's amateur operator license
- To shake hands with Yokozuna KAKURYU ☺ (Mission Completed)



8. Milestones of frequency coordination for BIRDS

To allow for radio communications with BIRDS using amateur radio spectrum, official permission is required. There is a procedure for getting it, which is roughly outlined below.

There are four big milestones in this procedure:

1. Coordination with **IARU** (International Amateur Radio Union). Ref: <http://www.iaru.org/>
2. **Submission of API** (Advance Publication Information) to **ITU** (International Telecommunication Union) Ref: <http://www.itu.int/en/Pages/default.aspx>
3. API released to ITU member countries
4. After the deployment of satellite in space, the owner of the satellite notifies the ITU (via government) that the satellite is operational.

In November 2016, Step [2.] was completed. Now we have to wait for the ITU to do Step [3.]. Usually, launch providers (JAXA in the case of BIRDS) require the release of the API before allowing launch of the satellite(s).

The information above was provided by Dr. Naomi Kurahara of the Infostellar company of Japan





Request for Information

If you know anyone who might be interested in joining BIRDS-3, please contact me.

My email is maeda@ise.kyutech.ac.jp

The basic terms (conditions) for BIRDS 1 through 3 are all the same. Past issues of this newsletter explain well what BIRDS is all about. It is about helping non-space-faring nations become space-faring nations. This assistance is promoted, supported, and endorsed, by the United Nations as an important **Capacity Building** activity.

G. Maeda, 01 Dec. 2016.

10. The Mongolian team, plus two visitors from Mongolia



The visitors are:

A
Prof. Ulam-Orgikh

B
Mainbayar Altansukh (will
take charge of the BIRDS
ground station in Mongolia)

← Holding the flag of Mongolia.
Taken on Tobata Campus on 29 Nov 2016.
Actually, there are seven persons in this photo.

11. Deadline reminder for 2017 PNST applications

Each year, 4 Phd and 2 Ms students are selected.



The screenshot shows the website header with the United Nations logo and the text "UNITED NATIONS Office for Outer Space Affairs". A navigation menu includes "About Us", "Our Work", "Benefits of Space", "Information for...", "Events", "Space Object Register", and "Docu". A breadcrumb trail reads "Our Work > Programme on Space Applications > BSTI > Fellowship Programme". The main heading is "Basic Space Technology Initiative Fellowship Programme". Below it, the text reads "United Nations/Japan Long-term Fellowship Programme 2017 Post-graduate study on Nano-Satellite Technologies (PNST) (Kitakyushu, Japan)". A red box highlights the text "Update 4 September 2016 Applications for the 2017 intake are now being accepted until 22 January 2017." A yellow callout box with red text says "This is the deadline".

<http://www.unoosa.org/oosa/en/ourwork/psa/bsti/fellowships.html>

12. Introducing Prof. Duger Ulam-Orgikh of Mongolia

This slide was
submitted by Erka.

Full name: Duger ULAM-ORGIKH

Nick name: Uka

Affiliation: Professor at National University of Mongolia

Background: Quantum theoretical physics

Duration of stay at Kyutech: Nov 25, 2016 ~ Jan 25, 2017

Purpose of stay:

- Monitor the flight model development of BIRDS-1 satellite, have discussions of missions and the possibility of the next Cubesat
- Prepare joint research and produce papers
- Discuss recent and future problems, and its possible solutions
- Acquaintance with ground station principles and procedures with Mr. M.Altansukh
- To shake hand with Yokozuna KAKURYU ☺ (Mission Completed)



13. Management of ANU (Ghana) visits KMUTNB (Thailand)

- **Date of visit to KMUTNB :** Wednesday 16 November 2016
- **Visitors from ANU:**
Dr. Samuel Donkor – President; Dr. Carlene Kyeremeh - Vice President; and Rev. Adriana Ion - Registrar
- **Purpose**

The ANU management -- after attending this years' General Conference for the *International Association of Universities* (IAU) which was held in Thailand -- paid an informal visit to the Space System Laboratory (SSL) in KMUTNB. The ANU management team met the top officials of the Lab, including Dr. Phongsatorn and Prof. Suwat, who is the director of SSL. The visit was proposed by Mr. Benjamin Bonsu of Ghana of the BIRDS team and was coordinated by Mr. Apiwat Jirawattanaphol of Thailand of the same team.



From left:
Dr. Phongsatorn, Dr. Donkor, Dr. Carlene, Prof. Suwat and Rev. Adriana Ion

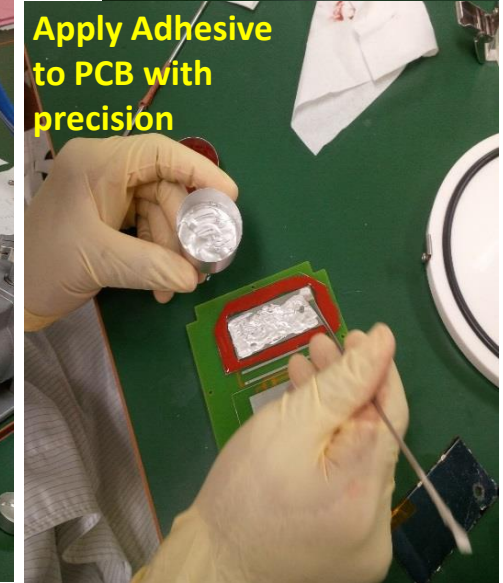
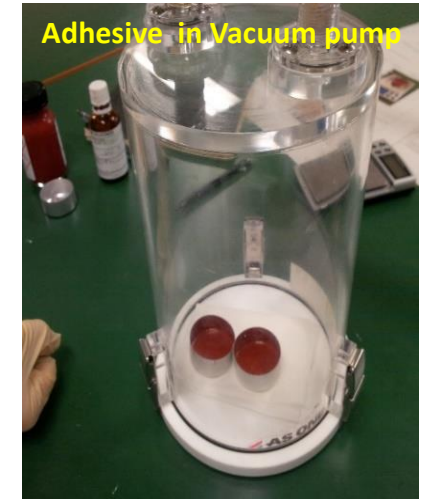
Thanks to Ben and Apiwat for making this BIRDS Network meeting in Bangkok possible. Nice work guys.

Visiting the "RF and Microwave Lab", whose director is Prof. Suramate.

From left:
Prof. Suramate , Mr. Ponlawat, Mr. Nawarat, Rev. Adriana Ion, Dr.Carlene, Dr. Donkor and Prof. Krongkaew



14. Each team undergoes rigorous practice for solar panel attachment



Because of their fragile nature, cost and precise procedures, Solar Panels need a lot of hands-on practice before we dare to attach for Flight Model

15. BIRDS engineers do ground operation practice with actual HORYU-4 passes

HANDS ON TRAINING FOR OPERATIONS



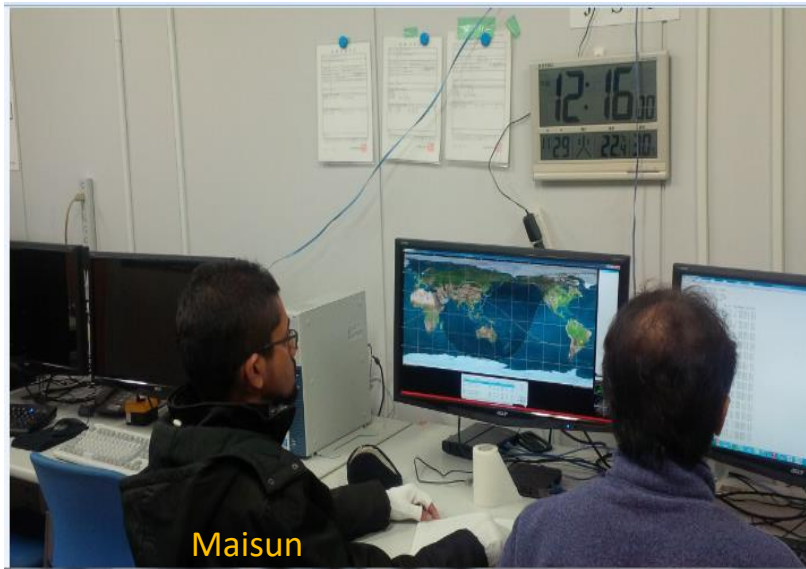
Antara



Ernest



Joseph



Maisun

BIRDS team members become active in Horyu-4 Ground Station operation as training towards BIRDS Ground Station operation in 2017.



POS mission tests – Receiving Horyu-4 signals



16. Azami and Syazana (both UiTM of Malaysia) join BIRDS-2 Team



01 Dec. 2016

A - MUHAMMAD HASIF BIN AZAMI

B - SYAZANA BASYIRAH BINTI MOHAMMAD ZAKI



اُونِيُوَرَسِيْتِي تِيكْنُوْلُوْجِي مَارَا
UNIVERSITI
TEKNOLOGI
MARA

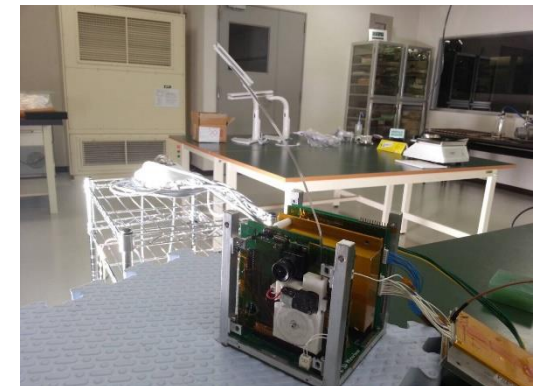
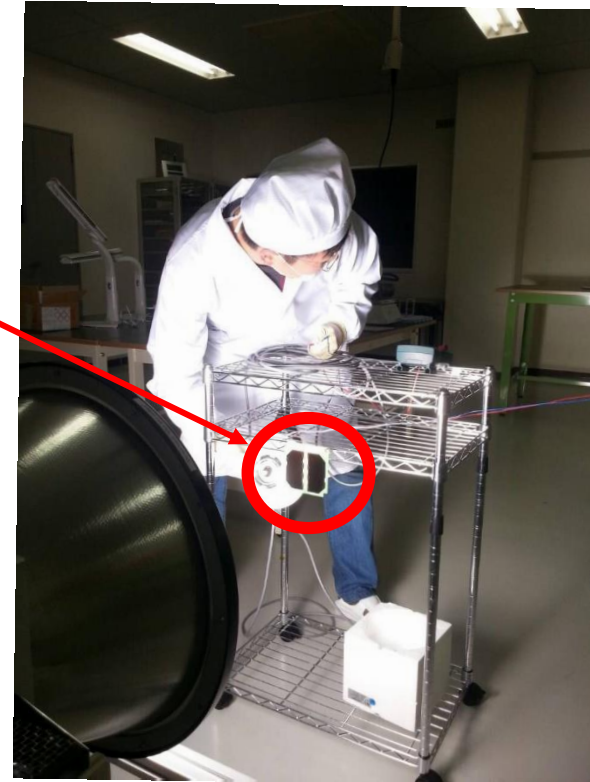
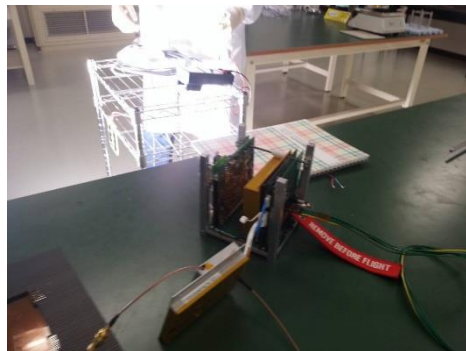
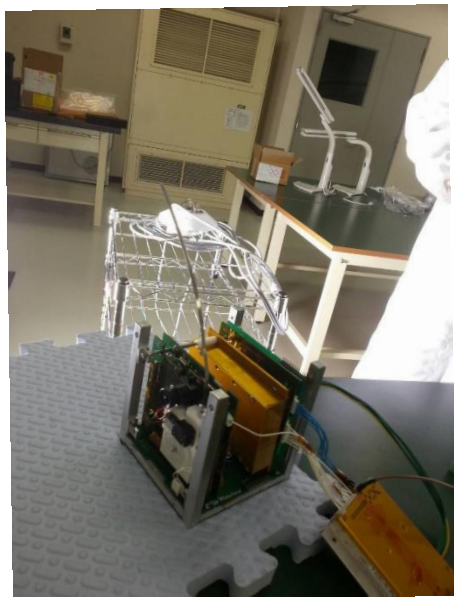
Welcome **Azami** and **Syazana**, new BIRDS-2 students from UiTM (Malaysia). They complete the formation of the BIRDS-2 teams:

- Philippines: 2 students
- Bhutan: 3 students
- Malaysia: 2 students
- Japan: 2 students

17. Full-discharge-and-recovery test on the batteries

These photos show Erka (Mongolia) carrying out a full-discharge-and-recovery test on BIRDS-1. When in space, it is possible for the batteries to totally discharge. This is OK if the satellite can recover. These photos show the recovery confirmation for the worst case situation (i.e., only one solar panel getting sunlight). He used a sun simulator (producing 1400 W/m²), **one solar panel**, and EM2 satellite. An important result was achieved.

Date of photos:
5 December 2016.



18. Introducing Prof. Mohammad Tariqul Islam

He is a visiting scholar at Kyutech from 6-Dec to 5-Feb, for research and education.

Mohammad Tariqul Islam is a Professor at the Department of Electrical, Electronic and Systems Engineering of the Universiti Kebangsaan Malaysia (UKM). He is visiting KyuTech from 6th December, 2016, to 5th February, 2017. He is currently the leader of the Communication Engineering Research group of Engineering Department and also plays the lead role in Radio Astronomy Informatics group at UKM.



He is the author of over 300 research journal articles, nearly 165 conference articles, 4 research level books and a few book chapters on various topics related to antennas, microwaves and electromagnetic radiation analysis with 11 inventory patents filed. Thus far, his publications have been cited 1990 times and his H-index is 26 (Source: Scopus). He is now handling many research projects from the Malaysian Ministry of Science, Technology and Innovation and Ministry of Education. His research interests include communication antenna design, radio astronomy antennas, satellite antennas, and electromagnetic radiation analysis.

He is currently involved in the BIRDS-1 Project, overseeing the design and implementation of the UHF and VHF patch antennas. These antennas are very compact in size, which allows their use in Cubesats. Previously, he provided the novel high gain S-band antenna design for Horyu-IV, which is currently functioning in orbit. Also, during his stay, he will be conducting a 2 credit hour course on satellite communication; see the next page for photos.



Prof. Tariqul visits the Ground Station (for Horyu-4, BIRDS, etc.) on the 8th floor of Building S-2.



The first lecture of “Satellite Communication” on 12 Dec 2016; there are many BIRDS students taking this class.

19. BIRDS-2 students sit amateur radio license exam

This section (Section 19) was created by Cheki of Bhutan.

On 3rd December 2016, a team of ten Amateur-Radio-Operating - license seekers made a trip to Miyaki City Hall in Saga Prefecture. The team consisted of 5 members from BIRDS II (2 from Philippines and 3 from Bhutan), 2 students from Thailand and 3 from BIRDS I (2 from Ghana and one from Bangladesh). Different participants sat for different classes of license exam.



Leaving for the exam center from Kyushu-ko-dai-Mae Station (~ 1.3 km from Kyutech). But, first... a selfie of course!



Lost for a moment. What was supposed to be a trip of little less than one two hours turned out to be more than expected. Boarded the wrong train!

Introduction to Amateur Radio

Amateur radio is a worldwide group of people who communicates with each other over a wide frequency spectrum using many different types of wireless equipment. However, to operate on the amateur frequency spectrum, one needs to get license. Licensed amateur radio operators can then talk to their neighbors (although it would be little weird to talk to your neighbor next door using amateur radio, it would be fun), cousins living in different states, strangers around the globe and make friends or even with the astronauts in outer space. The best part is, amateur radio frequency spectrum is free! More importantly, amateur radio community can provide emergency communications in time of disaster.

Generally, each country has its own licensing arrangements. Also, the license has different classes. The higher the class of license, more the privileges on usage of allowable frequency bands.

So, why amateur radio license for BIRDS project?

The cubesats of BIRDS project use amateur frequency spectrum for communication. To operate the cubesat, license is required.

Why the FCC* license?

Well... because the participants can't read and write (spoken skill is marginal at best) in Japanese language. The idea is to get FCC license and then convert it to Japanese license. Japanese members of the BIRDS team will take the license exam of Japan

**FCC stands for Federal Communications Commission, which is an independent agency of United States. FCC look after the Amateur radio license.*



Last minute revision in the waiting lobby of the Exam Center.

“The amateur license examination was held in the countryside of Saga Prefecture. Our trip to the venue gave us an opportunity to explore Japan's countryside together while also enjoying each other's company. It was my first chance to actually experience the countryside, which I could only see through the window of the shinkansen in my previous travels in Japan. It was really a great adventure to see a lot of traditional Japanese houses blending harmoniously in the modern Japanese society. At least for this case, I could say that Japan is amazing because the country sides have very accessible train services, which allow people to go to cities almost seamlessly. This is very different in my country, where people usually ride a series of buses and jeepneys to get to their urban destination, and vice-versa. Finally, the examination was also a good chance to connect with the amateur radio community in Japan.”



Adrian C. Salces
Philippines

Glimpses from the Trip



Exam center: Miyaki City Hall, Saga prefecture.



“It's a good experience to go to saga as the venue of the ham amateur radio examination. It's a good city although we don't have much time to explore that city. The Travel is good even if it is far I have a great day with my team that time having a great adventure of train transfer and looking for the exam location just like an Amazing Race.”

Joven C. Javier
Philippines

“It was an exciting experience to take the Amateur Radio Exam which fundamentally marked my entrance to the world of communications. The exam venue was quite far in terms of distance as compared to the usual exam venues I am used to. However it was a fruitful opportunity to visit another prefecture of Japan.”

Yeshey Choden
Bhutan



Participants with Volunteer Examiners. Not anyone with free time can volunteer to be an examiner. They have to be certified by the FCC.

"The train journey was the highlight for me. Boarding a wrong train and taking a new route to the exam center. Apart from that, was busy with last minute preparation while going and sleeping while coming back."

***Kiran K. Pradhan
Bhutan***



"The trip made me realize how beautiful Japan is with well mannered people wherever you go. Things are all systematic in this country. Love this country"



***Cheki Dorji
(Your reporter
for this section)
Bhutan***



END OF ISSUE NO. 11

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**This is the last issue
for 2016. See you
again in 2017.
Happy New Year from
the BIRDS Project.**