BIRDS Project Newsletter

Issue No. 20 (18 September 2017)

Edited by:
G. Maeda, Tejumola Taiwo, Joven Javier, M. Cho,
Laboratory of Spacecraft Environment Interaction Engineering (LaSEINE)
Kyushu Institute of Technology (Kyutech)
Kitakyushu, Japan

Members of BIRDS-1 Team and BIRDS-2 Team -- 16 May 2017, at Tobata Campus
Note the mock-up being held by Antara in the front row.

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.

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The Guest Box

The Federal University of Technology, Akure, Nigeria, will be hosting this event in November of 2017.
01. An outstanding video by JAXA about JAXA-Kyutech collaboration (BIRDS-1)

This 6.5-minute video can be downloaded from here
http://birds.ele.kyutech.ac.jp/video.html

The video is really well produced.
02. Events - UNOOSA

Check out these UNOOSA events – many are related to small satellites and to BIRDS – at their website

http://www.unoosa.org/oosa/events/search-events-ng.jspx#?c=%7B%22filters%22:%5B%7B%22fieldName%22:%22event.startDate_year_s1%22,%22value%22:%222017%22%7D%5D,%22sortings%22:%5D%7D

Upcoming:

● UNOOSA will have a booth at 2017 IAC in Adelaide, Australia, 25-29 September 2017, to explain various international space activities.


● From 20 to 21 June 2018 the international community will gather in Vienna for UNISPACE+50, a special segment of the 61st session of COPUOS. If possible, please attend it so that capacity building is supported at the UN – do not take it for granted. See the next page for more.
The seven thematic priorities of UNISPACE+50 are:

1. Global partnership in space exploration and innovation;
2. Legal regime of outer space and global space governance: current and future perspectives;
3. Enhanced information exchange on space objects and events;
4. International framework for space weather services;
5. Strengthened space cooperation for global health;
6. International cooperation towards low-emission and resilient societies;

If you want the UN to do more for capacity building, your nation needs to support Thematic Priority 7. If it is not supported, UN member states will conclude that capacity building is not important.
03. Malaysians of BIRDS-2 offer celebration event for the entire BIRDS-2 team

- Chocolate Muffins
- Chicken Gravy
- Mutton Curry
- ‘Roti Jala’
- Pickled veggie salad
- Carrot Cake
- Tomato Rice

A fantastic and colorful array of food from Malaysia
A                  B                           C               D
[A] Azami
[B] Akmal, Syazana’s husband
[C] Syazana
[D] Fadhilah, Azami’s wife

Akmal gives a presentation about Malaysia

Fadhilah and Syazana hold the nicely-made menu.

Below: Yummy food.
2017 Malaysian Independence Day Group Photo

Explaining the menu

Great Job
Malaysia
BIRDS-2 Team!

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Photo taken by G. Maeda
04. BIRDS Project is one of three finalists for the GEDC-Airbus Diversity Award

See the next 3 pages for social media announcements by Airbus regarding this competition:

① on Twitter
② on Facebook

http://www.gedcouncil.org/gedcairbusdiversityaward
Statement by the organizers of the Award

“BIRDS Project is one of three finalists for the GEDC-Airbus Diversity Award

The GEDC has teamed up with Airbus, the global leader in aeronautics, space and related services, to present the GEDC Airbus Award for Diversity in Engineering Education. This award is aimed at shining a light on successful projects which have encouraged more young people of all profiles and backgrounds to study and succeed in engineering. The 2017 Award has been placed under UNESCO patronage.

The long-term aim of the GEDC Airbus Diversity Award is to increase diversity among the global community of engineers so that the engineering industry reflects the diversity of the communities it supports, and the wide-ranging work that engineers do. The 2017 Award, which is the fifth edition, will be presented during GEDC 2017 Niagara Falls, Canada between October 10th and 13th, 2017.”

Note: BIRDS-1 Project Manager Taiwo will be at GEDC 2017 Niagara Falls to compete in the final round. Hang tough, Taiwo!
The announcement on Facebook

Congratulations to Kyushu Institute of Technology in Japan for their Joint Global Multi Nation Birds - BIRDS project, a unique collaboration with universities from developing countries including Ghana, Mongolia, Nigeria and Bangladesh. This exciting programme joins 10 other inspirational DiversityAward2017 projects from around the world on our 2017 shortlist. www.company.airbus.com/diversityaward #EmbraceDiversity

Facebook
<https://www.facebook.com/AirbusCareers/photos/a.378492408953051.1073741830.325409844261308/1027327414069544/?type=3&theater>
The Three Finalists for 2017

Attached media Airbus, UNESCO and GEDC select Australian, Canadian and Japanese projects for Diversity Award final

05. Messages from BIRDS members who return to their homelands this month

I invited them to say a few words; and to furnish one last photo.

They shall be missed.

G. Maeda
Editor

Dear Fellow Members of BIRDS-1 Team:
First of all, thank you very much for being part of my life. I am really proud to have been member of this great team. We made history to our countries. I hope this will be also future of our country and our friendship will become our countries collaboration in that future.

For me this project is opportunity to see life from wider angle. I wish you all the best for your career and personal life. Thank you very much see you in further.

Sincerely,
Erdenebaatar Dashdondog,
Mongolia, 2017/09/08

Mid-December of 2016, atop the Cho Lab building
Dear Fellow Members of BIRDS-1 Team:
I believe the BIRDS project has served as a platform for a good multi-cultural experience aside all the technical opportunities it currently serves. It has been good. My two year experience with this honourable team actually disproves a fact to me. An idea is painted that people from different places can be very different in any aspect we can think about. Well, it didn't seem so. I personally didn’t realize any significant difference in a particular person for which other team members have to be over-conscious about in order to prevent trespass or offenses. Ironically, I will say; “Different people are same everywhere”. Therefore I believe that the same basic ethics hold to all people and any good team, which is “The Right Intension, the Right Heart is the real boss”

Thank You
Ernest, Ghana,
2017/9/12

Dear Fellow Members of BIRDS-1 Team:
As always said, there is time for everything, and a season for every activity under the heavens. So there came a time we all set foot in the four walls of Kyutech [Specifically Prof. Cho-Lab]. It was a moment of adventure, studies, fun and teamwork. Our coming together as colleagues was really interesting and historic. Especially working together on a multicultural platform to build, launch and operate the first satellite of our home countries. Thanks to you all for sharing ideas and encouraging each other, not forgetting the moment of teasing and sharing of Jokes with the international flavour! In moment like this, it usually not exciting to say goodbye to comrades like you….. I opt to say “Hello” to us all on our next phase of Life! Let’s continually strengthen the international human network! Cheers!
Sincerely,
Quansah Joseph
Neenyi Kojo Krobo,
Ghana, 11/09/2017

Image taken on 27th June 2016 at the 1st BIRDS International Workshop reception at the Blue River Walk, Nishi Kokura, Japan.

First Attempt of BIRDs-1 CubeSat Launch by SpaceX.
[Seminar Room-LaSEINE]
Dear Fellow Members of BIRDS-1 Team:
A team is not about joining hands, it is about joining hands no matter what. The definition and meaning of teamwork is not found in management textbooks, but in the minds and hearts of team members. It makes me sad to have to leave, but also makes me feel happy to remember the good times we passed as a team and the satisfaction of having done the right thing. I’m going to start a new path in my life soon. Since now, we stop being co-workers, today I say goodbye to all of you who have been my friends and I thank you for making pleasant the moments we spent together. I know you will remember me every time, when you will search for your old picture of BIRDS project. :D 

I hope to meet you again one day.
Good job team, thank you.

Sincerely,
Raihana Shams
Islam Antara,
Bangladesh,
September 11, 2017.

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Dear Fellow Members of BIRDS-1 Team:
Last two year was a nice journey with you all. When I first came here I was very excited about the project because of its multicultural features.

This two years was very eventful. We work together, cooked together, organized space world, went to conferences. I will never forget the last day of 31st ISTS at Matsuyama when I got second best poster award for one of the BIRDS missions. Every member was very happy as it was the first of any award received by BIRDS.

I learned a lot in these two years. Before coming here, I was not in touch with corporate world. This project gave me the idea how corporate world and its politics goes on.

Last I want to thank you all to make this two years one of the most memorable one.

Sincerely,
Abdulla Hil Kafi
Bangladesh,
September 11, 2017
BIRDS-2
CAM Mission Update
[ the next four pages ]

Hearing 100 times doesn't compare to seeing once
https://blog.skritter.com/2017/02/japanese-proverbs-

Article prepared by:
Muhammad Hasif Bin Azami (Malaysia)
11th September 2017
Current Design of CAM Mission

*BIRDS-2 will have 2 OVCAMs for capturing images and recording short video*
Installation of CAM Lens

Steps of tuning the camera’s lens at infinity focus

I. Place the special pattern
   a. Near distance (3m)
   b. Far distance (10m)

II. Try to focus at the centre point of the pattern

III. Check the pattern’s other lines

IV. Try to capture a long distance image (building, mountain, etc.)

V. Finally, ensure the camera captured sharp and clear images

Guidance from Amara (BIRDS-1)
Results of Tuning CAM Lens

OVCAM1 in 5MP resolution (f=25mm)

OVCAM2 in 5MP resolution (f=8mm)

Random image in low resolution (f=8mm)

Sequential of images saved into full FIFO memory create a short video at low resolution
High Power Consumption Issues
(action taken after CDR of 18 July 2017)

• Carried out **Thermal Camera Observation Testing** to monitor power leakage of CAM subsystem on mission board

• From the testing, we make some changes:
  I. We will use CAM_MCU of **Atmega2560V (3.3V)** instead of Atmega2560 (5V)
  II. Controlling both OVCAMs by adding 1 **power switch** for each camera

Before power line turned ON

After 3.3V power line only turned ON (front side view)

After 5V power line only turned ON, the flash memory and MUX shouldn’t turned ON because they are using 3.3V power line (back side view)

End of CAM article by Azami
The Ten Rules for BIRDS engineers, now and forever

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

07. Reminder: The Ten Rules of the BIRDS Project (for students)

BE PUNCTUAL AND INSIST ON IT IN OTHERS.

THERE IS NO SUBSTITUTE FOR HARD WORK

Thomas Edison

This page was originally published in Issue No. 10 of the BIRDS Project Newsletter.
08. Reminder: The 2nd BIRDS International Workshop, in Ghana

Section 08 is comprised of 3 pages, including this page.

Hosted by:

ALL NATIONS UNIVERSITY COLLEGE

http://www.anuc.edu.gh

Co-sponsored by: Kyutech

Kyushu Institute of Technology

See pages 12-14 of Issue No. 16 of this newsletter for the original announcement.
Koforidua is about 2 hours by car from the airport.

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<th>Date</th>
<th>Day</th>
<th>Events</th>
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<td>19 Nov. 2017</td>
<td>Day 0</td>
<td>Arrive in Ghana</td>
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| 20 Nov. 2017| Day 1| AM: Intro’s and keynotes  
PM: Panel discussion about *Galamsey*                                    |
| 21 Nov. 2017| Day 2| Other panel discussions (formation of Ghana space agency, MDR for GhanaSat-2) |
| 22 Nov. 2017| Day 3| Main BIRDS Workshop, including technical session on *Store and Forward* |
| 23 Nov. 2017| Day 4| Excursion to the Volta River                                           |

Due to the time needed to secure a visa for Ghana, if you are interested in attending this workshop you must express an interest before 01 Oct. 2017.
The 2nd BIRDS Int’l Workshop is conducted in parallel with:
The 6th Space Science and Satellite Technology Applications Conference (SSTA)

Some scenes from the 5th Annual SSTA

http://anuc.edu.gh/home/imagegallery/5th-annual-international-conference-on-space-science-satellite-technology-applications/7/7/subgallery.html
BIRDS-2 Antenna Selection
Design & Configuration

This article was submitted by
Syazana Basyirah (Malaysia)
on August 30th 2017.

From the antenna radiation pattern measurement test performed in an anechoic chamber, we realized that patch antenna (redundancy from BIRDS-1) did not meet BIRDS-2 link budget estimation (gain within 0 – 2.2 dBi). Since we have an APRS and Store & Forward mission that require higher gain in VHF uplink and downlink, we need to select the best option of our antenna subsystem to achieve successful communication.
BIRDS-2 Antenna Design Configuration at +Y Board
(Previous Design)

Merits of using Patch Antenna

- Simple integration
- Easy to use
- Redundancy as BIRDS-1
- No deployment

Demerits of using Patch Antenna

- Shifted center frequency
- More directional radiation pattern
- Change its characteristic after attached to CubeSat
- Space constraint

1 Patch antenna:
- UHF command uplink: 437 MHz
- UHF mission/telemetry/CW downlink: 435 – 438 MHz

1 Monopole antenna:
- APRS-DP/S&F-RDC Uplink/Downlink: 145 MHz
Monopole Antennae Deployment Mechanism for BIRDS-2 CubeSat

Nano-satellite has faced problems in designing antennae deployment system due to space and deployment mechanism constraints. After discussing this matter among BIRDS-2 team members, we finally came out with an approach to implement the design of UHF and VHF deployable monopole antennae in BIRDS-2 CubeSat.

Both monopole antennae deployment will be using a nichrome wire burning release mechanism which when activated, it will be heated up and thermally cut through fishing lines, and allowing the two monopole antennae to be deployed on +Y board and at +Z axis direction of the satellite.

The UHF frequency band was used for command uplink, mission, telemetry, and CW beacon downlink whilst the VHF frequency band was used specifically for APRS-DP/S&F-RDC mission for both uplink and downlink.

In order to achieve the effectiveness of the BIRDS-2 CubeSat communication system agreed with the link budget estimation, the dimensions of antennae on the CubeSat structure depend on the required gain and operating frequency.

Thorough analysis and experiments need to be performed to ensure the mechanical, electrical interfaces of monopole antennae fit with the satellite. The nichrome wire burning release mechanism should be verified 100% works successfully on the ground. The functionality test results of the antennae deployment will be analyzed particularly on the deployment time, current drawn across the nichrome wire and the nichrome wire temperature differences (during thermal vacuum test).
BIRDS-2 Antenna Design Configuration at +Y Board
(Current Design)

Merits of using Monopole Antenna
• High gain
• Easy center frequency tuning
• Omni-directional radiation pattern
• Stability

Demerits of using Monopole Antenna
• Complicated deployment mechanism
• Need to do a lot of functionality test to verify 100% successful antenna deployment
• No redundancy

• 1 Monopole antenna:
  UHF command uplink: 437 MHz
  UHF mission/telemetry/CW downlink: 435 – 438 MHz

• 1 Monopole antenna:
  APRS-DP/S&F-RDC Uplink/Downlink: 145 MHz

Monopole antennae
Screws for retention fishing lines
+Y board (external configuration)

Secure part (VHF antenna)
Nichrome wire coils
Screws for retention fishing lines

Secure part (UHF antenna)
Challenges of Implementing Current BIRDS-2 Antennae Design Configuration

Monopole antenna dislocated easily from the mounted screw if the tightened technique is not followed accordingly

Battery capacity used is charged to 10% capacity charging and the capacity need to monitored throughout the functionality test

Room temperature functionality test should be performed frequently to ensure the deployable antenna works 100% successfully on ground

The fishing lines has to be tightened and secured carefully to ensure both antennae will be deployed successfully. This pic shows one of the UHF antenna got stuck due to the wrong technique of tightening the fishing lines

The vacuum chamber needs to be opened/closed before/after performing the functionality test for every thermal cycle because the antennae need to be tightened from the beginning

The antenna deployment test needs to be conducted in a few thermal cycle (hot and cold) temperature condition to ensure that the burner circuit can withstand the worst condition in space, especially at -40°C

End of BIRDS-2 antenna article by Syazana
UN/Austria Symposium
Access to Space: Holistic Capacity Building for the 21st Century

Graz, Austria
3rd – 7th September, 2017
Organized by United Nations Office for Outer Space Affairs
Written by: Yeshey Choden for Issue No. 20 of BIRDS Project Newsletter
Bonsu, Yeshey and Reuben at the symposium
(Left) Venue of symposium: Technical University of Graz

(Right) Welcome note by the organizers
Presentations by Kyutech BIRDS students
There were a number of interesting panel discussions on various topics
Facility tour at TU Graz
Dinner hosted by the Mayor of Styria and governor on separate days
Meeting new friends and spending quality time with them
### 11. BIRDS students participate in LaSEINE Summer Camp at a retreat in Oita Prefecture

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<td>Rise</td>
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<td>8:50-9:00</td>
<td>8:00-9:20</td>
<td>Breakfast</td>
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<td>9:00-13:00</td>
<td>9:30-10:00</td>
<td>Lecture-5 (Taiwo) &lt; practice BIRDS presentation for Airbus competition at Niagara Falls, Canada &gt;</td>
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<td>13:30-14:00</td>
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<td>Lecture-6 (G. Maeda) &quot;How to start a space business&quot;</td>
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<td>14:00-14:30</td>
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<td>Lunch (bento box)</td>
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<td>14:30-14:40</td>
<td>10:40-11:10</td>
<td>Lecture-7 (Dr Amelia) &quot;Tasmania&quot;</td>
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<td>14:40-15:10</td>
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<td>Lecture-8 (Dr Masui) &quot;Units&quot; 「単位」について</td>
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<td>15:40-15:50</td>
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<td>Lecture-9 (Dr Pauline) &quot;Synchronized Swimming&quot;</td>
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<td>15:50-16:20</td>
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<td>Lecture-10 (Dr Kim) &quot;Trans Siberian Railway&quot;</td>
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<td>14:00-14:10</td>
<td>Break</td>
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<td>18:10-18:30</td>
<td>14:10-14:40</td>
<td>Lecture-11 (Prof Toyoda) &quot;Vacuum Systems&quot;</td>
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<td>18:30-19:30</td>
<td>14:40-18:00</td>
<td>Free Time</td>
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<td>19:30-22:30</td>
<td>18:00-20:00</td>
<td>BBQ - barbecue</td>
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<tr>
<td>22:30</td>
<td>20:00</td>
<td>Free Time</td>
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**MEALS**
- 8:00-9:20 Breakfast
- 8:00-9:20 Breakfast
- 9:30 Checkout and depart
- 10:00-10:30 Lunch (bento box)
- 13:00-13:30 Lunch (bento box)
- 18:00-20:00 BBQ - barbecue

**LECTURES**
- Lecture-1 (Bhutan Student Kiran) "School System & Student Life in Bhutan"
- Lecture-2 (Dr Yamauchi) "Gourmet Map in Kokura"
- Lecture-3 (Dr Kate) "How to become an astronaut"
- Lecture-4 (Prof Cho) "Introduction to Standards"
- Lecture-5 (Taiwo) < practice BIRDS presentation for Airbus competition at Niagara Falls, Canada >
- Lecture-6 (G. Maeda) "How to start a space business"
- Lecture-7 (Dr Amelia) "Tasmania"
- Lecture-8 (Dr Masui) "Units" 「単位」について
- Lecture-9 (Dr Pauline) "Synchronized Swimming"
- Lecture-10 (Dr Kim) "Trans Siberian Railway"
- Lecture-11 (Prof Toyoda) "Vacuum Systems"

**SPORTS**
- Table tennis

**JOINT TRAINING CENTER**
- 11. BIRDS students participate in LaSEINE Summer Camp at a retreat in Oita Prefecture
9 AM Departure from Kyutech on 4 Sept.

Convoy of 9 rental cars

Loading the cars
Road trip from Kyutech to Kyujuu Camp

Trip takes about 3 hours

Many tunnels and bridges

Lunch in Yufuin
Lectures of Day 1

Gourmet map in Kokura

School System & Student Life

Kate

山内

Yamauchi
Lectures of Day 1 -- continued

Basketball and indoor soccer after the lectures
Off to dinner of Day 1

A rental car develops trouble

Students push the car

The problem: Transmission broke down

-- the car had to be replaced the next day

暗い山の中でちんたら運転になりました。
The screening 上映 of Shin Godzilla

Breakfast of Day 2

It says Kyutech
Lectures of Day 2

Taiwo practices his Airbus Diversity Contest presentation

How to start a space business

Dr Amelia Greig discusses Tasmania

BIRDS Project Newsletter – No. 20
Lectures of Day 2 -- continued

Dr Masui discusses “Units” 「単位」について

Dr Kim

Traveling the Trans Siberian Railway

Synchronized Swimming
A short-lived story on my best efforts to become a mermaid

LaSENE Summer Camp, September 4-6, 2017
Pauline Faure

BIRDS Project Newsletter – No. 20
Lectures of Day 2 -- continued

Prof. Toyoda
“Vacuum Systems”

2017 Summer Camp BBQ Barbeque
Facilities

The dance session . . . occurred after the BBQ
2017 LaSEINE Summer Camp Group Photo – with a large number of BIRDS Project members.

This was taken just before leaving the facility (on 6 Sept) to return to Kyutech.

This photo courtesy of Dr. Kim
End of **BIRDS Project Newsletter**  
– Issue Number Twenty

This newsletter is archived at the BIRDS Project website:  

**Project website:**  [http://birds.ele.kyutech.ac.jp/](http://birds.ele.kyutech.ac.jp/)

When a new issue is entered into 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 purpose of it is to keep BIRDS stakeholders (the owners of the satellites) informed of project developments.