Members of BIRDS -1, -2, and -3 on 4 October 2017, at Tobata Campus

Archive website: http://www.birds-project.com/birds1/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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The Guest Box
From Mongolia (BIRDS-1)

This was a gathering of Mongolian space experts on 30 January 2018 to discuss the way forward for space-related technology in Mongolia. Location of this forum was the National University of Mongolia, NUM. This photo was kindly provided by Erka of BIRDS-1.
01. Kyutech President recognizes the importance of diversity in March 2018 commencement address

This is the commencement address by Kyutech President Oie on 23 March 2018. Among other points, he mentions the importance of diversity – and he highlights the GEDC Airbus Diversity Award secured by the BIRDS Project last year.

For English translation, see the link below.

http://www.kyutech.ac.jp/media/001/201803/gakuchokokuji_eng20180323.pdf
A discussion of the GEDC Airbus Diversity Award given to the BIRDS Project

Joyous scenes of graduation ⇒ (23 March 2018)

End of this section

From Mei Sen Kai journal
The OECD (the club of rich nations) has selected Kitakyushu City as an SDG Model City – the only one in Asia.

“The Sustainable Development Goals (SDGs) - also known as the Global Goals for Sustainable Development - are a collection of 17 global goals set by the United Nations. The broad goals are interrelated though each has its own targets to achieve. The total number of targets is 169. The SDGs cover a broad range of social and economic development issues. These include poverty, hunger, health, education, climate change, gender equality, water, sanitation, energy, urbanization, environment and social justice. The SDGs are also known as "Transforming our World: the 2030 Agenda for Sustainable Development" or 2030 Agenda in short. The goals were developed to replace the Millennium Development Goals (MDGs) which ended in 2015. Unlike the MDGs, the SDG framework does not distinguish between "developed" and "developing" nations. Instead, the goals apply to all countries.” -- from Wikipedia


More info about this city selection see here:
http://www.city.kitakyushu.lg.jp/kankyou/00101181.html
Businesses are also embracing the virtues of SDGs

ANA BLUE WINGが
SDGsビジネスアワード
2017部門賞を受賞

2017年5月26日、「ANA BLUE WING」は一般社団法人BoP Global Network Japanと金沢工業大学平本研究室が設立した「SDGsビジネスアワード」にノミネートされ、このたび部門賞を受賞しました！

「SDGs」とは、国連に加盟する世界193カ国が合意した、17項目からなる「持続可能な開発目標」のこと。社会課題解決型事業の分野で、取り組みが遅れていると捉えられがちな日本での様々な活動を、国際的に広く紹介することをめざして「SDGsビジネスアワード」が制定されました。

第1回目となる今回、「ANA BLUE WING」は、途上国と先進国双方の社会課題解決に貢献した企業に贈られる「クロスボーダー賞」を受賞。表彰式ではBLUE WINGプログラムに取り組んだ、社内の有志メンバーたちが盾を受け取りました。

See here for full details:
https://www.ana.co.jp/ana_news/2017/06/21/20170621-1.html

(cont’d next page)
The support of SDGs in Nigeria . . .

http://sdgs.gov.ng/

(continues on next page)
The Sustainable Development Goals (SDG) have opened up new markets for the private sector that need to be explored and require policy alignment, speakers at an economic conference have said. Economists and business leaders gathered at Dhaka’s Brac Centre Inn yesterday for the third Annual Economists’ Conference, discussing the country’s future and the role of the private sector in it. The topic of yesterday’s session was ‘Reforms needed to facilitate private sector engagement for SDG achievement in Bangladesh.’ The session was jointly organized by the South Asian network on Economic Modelling (SANEM) and the Dhaka Metropolitan Chamber of Commerce and Industry (MCCI). “SDG is creating new markets that were previously inaccessible to the private sector,” explained M Masrur Reaz, senior economist in the Trade and Competitiveness Global Practice of World Bank, citing greater participation in health and education sectors as an example . . . .
Date: 25th April, 2018
Venue: SVBL 3rd Floor Lobby
Participants: BIRDS-2 team members

This report prepared by:
Yeshey, BIRDS-2, Bhutan

03. BIRDS-2 team socializes over pizza
On 25th April, 2018 BIRDS-2 team members gathered at the SVBL 3rd floor lobby for a pizza dinner party sponsored by the project manager Joven.
BIRDS–2 team members posing for a group photo
A variety of pizza flavors including halal were served with orange and apple juice
A group photo taken during the pizza dinner party
Cheki, Joven and Kiran enjoying the pizza
Overall, it was a great team bonding session. Team members livened it with fun conversations and discussions about university life and satellite project.

*Thanks to Joven for the treat!!!*
To see what kind of things that UNISEC-Global does, have a look at this photo report of the Rome meeting of December, 2017. *Join the consortium!*


CONTINUED ON THE NEXT PAGE
“Satellite Tracking Ocean Currents for Marine Searching and Rescue”

Phongsakorn Meemak
Kyushu Institute of Technology, Japan

Above: Presentation by a Thai student from Kyutech – he was in the editor’s PBL class.

Group photo of the participants of the Rome meeting – December of 2017.

End of this section
05. UiTM web news: UiTM team meets the Dean

20 March 2018

The First Nano-Satellite From Malaysia

Director of RIG-FKE, UiTMSAT, Associate Professor Ir. Dr Mohamad Huzaimy Jusoh and his team made a courtesy visit to the Dean’s office on 14 March 2018. Also present at the visit were two satellite postgraduate students from Japan: Ms Syazana Basyirah binti Mohammad Zaki (PhD) and Mr. Muhammad Hasri bin Azami (MSC). Both of them are from the Department of Applied Sciences for Integrated System Engineering, School of Engineering, Kyushu Institute of Technology, Japan.

The visit was aimed at providing a report on the development of the country’s first Nano-Satellite project (BIRD 2) which the team is working on in Kyushu, Japan.

See full article here:
See full article here:
06. BIRDS is explained on Gunter’s Space Page

Bird B, BTN, G, J, JPN, LKA, M, MYS, N, NPL, PHL
(BRAC Onnesha, Bhutan 1, GhanaSat 1, Toki, Uguisu, Raavana 1, Mazaalai, UiTMSAT 1, EduSat NepaliSat 1, MAYA 1)

http://space.skyrocket.de/doc_sdat/bird.htm
07. Facebook of BIRDS-3 – have a look

https://www.facebook.com/BIRDS3satellite/
08. UN small sat symposium in Brazil

**Updates at the website:**
- Update 11 April 2018: Industry Exhibition (new)
- Update 11 April 2018: Hands-on Workshop (new)
- Update 11 April 2018: Information Note (updated)
- Update 10 April 2018: Accommodation Alternatives (updated)
- Update 03 April 2018: Online registration is now open.
- Update 14 March 2018: Accommodation Alternatives
- Update 08 March 2018: Information Note

**FIELD TRIP / HANDS-ON WORKSHOP**

In addition to the Symposium programme, an optional field trip to the Hell’s Barrier Launch Site and the Space Visitor Center will be organized on 14 September 2018.

A hands-on workshop on nanosatellite mission design and testing will be provided for a limited number of selected participants.

**EXHIBITION**

An industry exhibition will be organized in conjunction with the Symposium.

Olayinka Fagbemiro
Principal Scientific Officer
National Space Research and Development Agency (NASRDA)
● National Coordinator, Universe Awareness (UNAWE)
● National Coordinator, Astronomers Without Borders (AWB)

G. Maeda with Olayinka Fagbemiro, at the headquarters of NASRDA, the Nigerian space agency, on 2 May 2018.

09. National Space Museum being built in Nigeria
10. Kyutech visits Landmark Univ. in Nigeria

On 3 May 2018, G. Maeda along with Dr S. Onuh (NASRDA) visited LMU to explain the capacity building programs of Kyutech.
For more details on Kyutech’s visit to LMU see also the website of Landmark University:

https://lmu.edu.ng/lmu_news/lmu_partner_kyutech
11. Reminder to acknowledge the support of JSPS

When you publish something that is remotely related to BIRDS, please include the statement below. It helps us with more funding from JSPS. After your work is published, please send pdf copy to me and Prof Cho. We enter it into our records.

Acknowledgement of support

This work was supported by JSPS Core-to-Core Program, B. Asia-Africa Science Platforms.
12. A rocket designed for CubeSats

https://www.wired.com/story/rocket-lab-still-testing/

The launch company Rocket Lab has amusing names for its missions. The first, in May, was called “It’s a Test” (it was). When the staff debated what to call the second launch of their diminutive Electron rocket, so sized (and priced) specifically to carry small satellites to space, they said, “Well, we’re still testing, aren’t we?” They were. And so “Still Testing” became the name of Rocket Lab’s second launch, which took place on January 20, at around 8:45 pm Eastern Standard Time. In December, the company canceled multiple attempts before rescheduling the launch window for 2018. The livestreamed rocket lifted off from the Mahia Peninsula in New Zealand, headed for someplace with an even better view.
Despite the uncertainty surrounding the launch (or any test launch, for that matter), the rocket was carrying real payloads for real customers: three small satellites, one for a company that images Earth and two for one that monitors weather and ship traffic. But why on Earth would a satellite company choose a rocket-in-progress when there are so many reliable launchers out there? After all, even established rockets blow up sometimes.

**Rocket Lab**
The short answer is that smallsats—which the Electron was built to transport, exclusively—are by nature expendable. Smallsat makers like Planet and Spire, the two clients on this mission, have ever-growing, genetically similar populations of orbiters. So losing one or two in a less-than-successful test flight? Probably worth the risk. Smallsat companies are willing to put their hardware on this particular liftoff line because the Electron is poised to be the first commercially bookable rocket built specifically for small payloads, which typically have to piggyback on big, expensive rockets with big, expensive payloads that don’t launch often enough and aren’t always headed to their orbit of choice. In the next decade, 3,483 small satellites (between 1 and 100 kilograms) will go to space, generating just over $2 billion of launch revenue, according to the Small Satellite Markets, 4th edition report, which research and consulting firm Northern Sky Research released last month. In this future world where thousands more smallsats provide environmental, economic, and even political intelligence, as well as Earth-covering internet, the test-steps necessary to get on up to space quickly, cheaply, and precisely seem worth the risk not just to Planet and Spire but, perhaps, to you and me.

But boy, was there risk. While Rocket Lab's first Electron didn’t explode and did reach space—and so gets at least an A- for its first attempt—“It’s a Test” didn’t quite get to orbit. After an investigation, Rocket Lab determined that, four minutes post-blastoff, ground equipment (provided by a third party) temporarily stopped talking to the rocket. When
For their part, Planet and Spire are here for that no-nonsense-ness. Planet already has around 200 satellites in orbit, so adding one to its flock of so-called "Doves" would be good but not critical. Besides, says Mike Safyan, Planet’s director of launch, “we picked one we wouldn't miss too much”: a sat named Pioneer. It’s a double meaning, says Safyan. First, it's an homage to NASA’s old missions, on whose shoulders they stand. Second meaning: They are pioneers. “There is this New Space wave that Planet is very much at the forefront of and Rocket Lab is very much at the forefront of,” says Safyan.

This is what the forefront looks like, by the way: You can book space on an Electron rocket online—just click the size of your smallsat!—the same basic way you’d book a bunk on Airbnb. Spire, too, is into it. Jenny Barna met Peter Beck before she had her current job, as the director of launch at Spire, whose satellites aim to keep track of aeronautical and nautical- nautical traffic, as well as weather. Back in her days at SSL, which makes spacecraft and communications systems, a coworker invited her to a presentation Beck was giving on-site. She listened to Beck describe Rocket Lab’s technology, and his vision for a vehicle communication breaks down, Official Procedures demand that safety officials stop the flight. And so they did..
But the rocket itself, according to the same investigation, was sound—so the company moved on to a test delivery. “It’s really the next logical step,” says Peter Beck, Rocket Lab’s founder. Beck seems uncannily logical about the risks his young company is taking. When asked about his feelings about launching actual stuff on “Still Testing,” he replied that doing so certainly involved extra actual tasks. “I'm not sure if you can become extra nervous or extra excited,” he said. That sentiment fits with the launches’ pragmatic names. And those fit with New Zealanders’ general pragmatic streak, says Beck (he cites some of the country’s names for flowing water: “River One,” “River Two,” “River Three”).
that provided frequent, affordable launches just for little
guys—in an industry that caters to huge sats, and makes
smallsats second-class passengers—and she was intrigued.
“I remember sitting there thinking how lucky I am to be
working at this industry at this time,” she says. And after
she moved to Spire, she led the company to sign on as one
of Rocket Lab’s first customers. It's currently contracted for
up to 12 launches.

That's a lot! But Spire has to launch a lot. The company
wants access to space every month, so they can produce
their satellites in small batches, send them up, iterate, and
launch the next generation. So far, counting today, Spire
has launched 54 satellites. They’ve done it on the rockets
of Russia (Soyuz and Dnepr), Japan (H-IIB), and India (PSLV),
and the rockets of the US's Orbital (Antares) and ULA (Atlas
V). And now, they’ll ride with Rocket Lab, picking on a
rocket of their own satellites’ size.

But that doesn’t mean they’ll ever only use Rocket Lab. Or
Orbital. Or ULA. They plan to keep their eggs distributed—
partly because even when it’s not just a test, rockets still

blow up, the eggs breaking along with them. “It's
just part of the industry,” says Barna.

When Barna spoke of “Still Testing” a few days
before the initial launch window, she was straight-up
about the possibility that this particular rocket
wouldn't carry the eggs safely to space. “We know
that a million things have to go perfectly for this to
be successful,” she said. “We hope they make
history.”

They did, and deployed the three-satellite payload
into orbit. And pending analysis of this seemingly
successful test, Rocket Lab will skip its planned third
test and jump straight into official operations, in
early 2018. “We've got a lot of customers that need
to get on orbit,” says Beck.

Suggestion for the third flight’s name: “This Is Not a
Test.”

https://www.wired.com/story/rocket-lab-still-testing/
MORE ON SMALLSATS

SARAH SCOLES
This New Goldilocks Rocket Is Just Right for Small Satellites

SARAH SCOLES
The Race to Rule the High-Flying Business of Satellite Imagery

SARAH SCOLES
Upending the Space Biz With Satellites for You and You and You

https://www.wired.com/story/rocket-lab-still-testing/

End of this article
13. Kyutech participates in TAS: Transform Africa Summit in Rwanda

7 – 10 May 2018, 4000 participants

http://transformafricasummit.org/

About the Summit

The Transform Africa Summit is the Smart Africa flagship event. Following three successful editions, the fourth Transform Africa 201 summit will take place at the Kigali Convention Center from 7 – 10 May 2018.

Under the theme ‘Accelerating Africa’s Single Digital Market’, the summit is expected to attract over 4,000 participants, including Heads of State and Government, First Ladies, UN Broadband Commissioners, Ministers, Public & Private Sector, International organisations, Industry leaders, Investors, Entrepreneurs, Young innovators, Civil Society and Academia.

This year’s summit will also feature the first Transform Africa Economic Forum, a Government to Business engagement which will take place on 7 May 2018, where attending Ministers and Cabinet Secretaries will engage with a targeted audience of business leaders and high net worth investors on investment opportunities and areas of collaboration.
The delegation from Japan is about 80 persons – including G. Maeda of Kyutech.
THE VENUE OF TAS – Kigali, Rwanda
The session on space topics

Digital Transformation Hub

Space Inclusion: Leveraging new lean space technology for SDGs

Custom Session | MH2B
Silver, Gold & Platinum delegates

2:00 PM, Wednesday, 9 May 2018

Conversation Leaders
Prof. Shinichi Nakasuka, Professor Department of Aeronautics & Astronautics, School of Engineering, University of Tokyo
Mr. Yasuhiro Yukimatsu, Director General Japan National Space Policy Secretariat
Prof. Shibasaki Ryosuke, Center for Spatial Information Science, Tokyo
Ms. Naomi Kurahara, CEO & Founder Infostellar
Dr. Ignace Gatave, Principal, UR CST,

Special Interventions
Piotr Dmochowski-Lipsk, Executive Secretary and legal representative of the European Telecommunications Satellite Organization, EUTELSAT IGO
Rashad Nabiyyev, Chairman and CEO, AzerCosmos

Moderated by
Alex Ntale, CEO, ICT Chamber
Warming up at the bench
GM explains BIRDS-2 to the ICT Minister 大臣 of Rwanda on 9 May

Alex makes introductions

“Gee, it is smaller than a football.”

“So how much does it cost?”

GM says, “Any country can make one.”

飛び道具
Some of the visitors to the Kyutech booth on 9 May.

“We can teach you how to make one.”

Photo from: 宇宙利用新領域開拓機構 川窪
14. Thai students of Kyutech create video to promote SEIC

View the video with English subtitles: https://www.youtube.com/watch?v=QgYO8mw3GGE
Dear Maeda-sensei,

During my stay in Thailand, I had the opportunity to introduce DDP to bachelor students in Dr. Phongsatorn’s class. I opened the video that was made by Pao-senpai and Air for introducing the SEIC program and environment in our lab. Furthermore, I also shared the experiences, how to study in DDP program and how to prepare themselves for DDP.

[at the left] you can see the photo taken by Dr. Phongsatorn.

Best regards,
Phongsakorn Meemak
Bangkok, 10 May 2018.
15. Visit of Bhutan by members of Kyutech

Kyutech visits Bhutan

Prof Cho and Dr. Pauline visited Bhutan to attend the Workshop on First Satellite of Bhutan along with 4 Students from Bhutan studying in KyuTech (BIRDS-2 members)

--written by Kiran Kumar Pradhan, BIRDS-2 Member (Bhutan), 11 May 2018
Entering Bhutan

(Left) View of mountains through the window of the plane while approaching Bhutan.

(Right) View of Paro Valley as the plane maneuvers between the mountains making a approach towards the airport.

(right) Picture of Kings of Bhutan Welcoming the passengers near the arrival gate.

(Left) Picture of the Royal Family of Bhutan adored by the Foreigners entering Bhutan
Evening stroll around the Capital: Thimphu

(Up) Famous Clock Tower Square. Hangout place for youths.

(Left) A well decorated round about on the main street of the Capital. The background shows two types of buildings in Bhutan: on the right, the smaller house is a typical traditional structure made of Mud while the one on left (taller) is the new architecture spreading in the country, made of concrete but still retaining the traditional touch (eg. carvings on the window pane).

(Right) Peach Blossom: the beauty of the spring season.

(Down) Walk on the most busiest street of the Capital: the Norzin Lam. But it still does not have a street light and the traffic is controlled by the traffic police.
The Memorial Chorten

The Memorial Chorten was built in memory of His Majesty the Third King of Bhutan who is considered as the Father of Modern Bhutan. It was under his reign that the very first roads were constructed in the country connecting to India which opened up the trade route. He introduced western science and technology while maintaining the culture and tradition of the country and brought in international aids for development.

Chorten: The word means “Seat of Faith” and elderly people can be seen throughout the day circumambulating and reciting prayers. https://www.bhutan.travel/attractions/national-memorial-choriten
Visit to MoIC

(Left) Prof Cho posing with two of his students from Bhutan (BIRDS-2 members) in front of the Ministry of Information and Communications Office (MoIC).

(Right) Prof Cho and Pauline with all the four Bhutanese students of LaSEINE after meeting the secretary of MoIC. Usually a government office in Bhutan has a national flag hoisted outside. Employees and all the visitors are required to come in formal attire.

MoIC is one of the 10 ministries under the Royal Government of Bhutan (RGoB) and currently overlooks the activities in ICT (including Telecommunications and Space) sector, Media sector, Road and Transportation sector, Aviation Sector of the country. Department of IT & Telecom is one of the 5 departments under the ministry and is a partner for BIRDS project representing the RGoB.
Meeting with MoIc Secretary

(Up) From left: Pooja, Prof Cho, Kiran, Dasho Karma W. Penjor (Secretary to MoIc), Cheki, Dr. Pauline and Yeshey after a meeting where the future collaboration between MoIc and KyuTech was discussed.

(Top left) Prof Cho presenting gift from KyuTech to Secretary.

(Top Right) Dasho Karma presenting gift to Prof Cho as a token of appreciation from MoIc.

(Bottom left) Dasho Karma presenting gift to Dr. Pauline.

© Mr. Karma Jamyang, DITT
© Dr. Pauline
© Dr. Pauline
© Dr. Pauline
The Team dropped by at the Buddha Point after the meeting with MoIC Secretary before heading towards the Workshop venue. The Buddha Point has become one of the prominent figures in the Capital of Bhutan and is visited my many tourists and locals each day. A 52 m tall Shakyamuni Buddha Statues sits on a mountain overlooking the southern approach to the Capital and is considered one of the tallest sitting Buddha. There are over 100,000 smaller Buddha statues inside which are built same as the main statue, with bronze and gilded in gold. It was build in celebration of the 60th Birth anniversary of His Majesty the Fourth King Jigme Singye Wangchuck. You can test your eye and identify Prof Cho and Dr. Pauline in the pictures above.
The Lunch Menu included some of the authentic Bhutanese delicacies as shown above.
View of Tashichoedzong

(Left) The team stopped by the road to get a view of Tashichoedzong, which is a Buddhist Monastery and Fortress and it now serves as central administrative building for the country. Tashichoedzong houses the office of the king along with the Central Monastic Body which oversees the Religious affairs. It is located close to main town of the Capital, Thimphu.

(Below) A panoramic view around Tashichoedzong and part of Thimphu valley.
BHUTAN-1 Workshop

(Up) Stage setup for the inaugural of the Workshop: The Workshop was hosted by the Department of IT & Telecom (DITT), MoIC. The first satellite of Bhutan, which was built as a part of BIRDS-2 project was the main topic of discussion.

(Right) Prof. Cho posing on the stage before the workshop kicked off. The stage is filled with different Bhutanese arts and crafts work. The curtains with unique Bhutanese design and the tables hand carved with traditional Bhutanese symbols.

The venue of the workshop was at the College of Science and Technology (CST) which is one of the engineering institution under the umbrella of Royal University of Bhutan (RUB). The CST is located in the South West town of Phuntsholing which shares border with India. It is about 5 hours drive away from the capital, Thimphu.
A typical decoration that can be seen outside the venue of an event which is graced by high ranked officials.

Some of the faculty members of the CST waiting for the reception of the Chief Guest for the Workshop, The Prime Minister of Bhutan.
(Up) The President of the CST welcomed the Honerable Prime Minister, Lyonchhen Tshering Tobgay as he approached the venue. It is a usual custom for the head of the organization to greet the Chief guest at the entrance and escort towards the venue while also apprising on how the event unfolds.

(Below) The 4 Bhutanese students currently undergoing Masters in Space engineering in KyuTech and also, member of BIRDS project greeted the Honerable Prime Minister at the entrance of the Workshop venue.

(Up) Before inaugurating the workshop, the Prime Minister met with Prof. Cho and Dr. Pauline to discuss about the BIRDS program, the schedule and BHUTAN-1 CubeSat.
BHUTAN-1 Workshop

(Up) Guests seated for the opening of the Workshop. Front row, from left: Ambassador Tshewang C. Dorji (Thailand), Dasho Karma W. Penjor (MoIC Secretary), Honerable Prime minister, Prof. Cho and Dr. Pauline. Back Row: Officials from District administration and PM’s office.

(Right) Master of Ceremony for the day, Ms. Karma Yuden Dorjee, Official of DITT. She was in KyuTech for the GS workshop and is one of the officer responsible for BIRDS related activities in Bhutan. Seated on the left is Mr. Dawa Lodey, another officer of DITT.

(Left) Dr. Cheki Dorji, President of CST gave a welcome speech to officially start off the workshop. Yes, his name is also Cheki Dorji, same as our BIRDS member from Bhutan, Cheki.
BHUTAN-1 Workshop

(Left) Following the Welcome Speech by the president of CST, the Prime Minister gave a very inspirational talk to all the students who were attending the workshop. He also highlighted on how that District, where the workshop was held, has been the place where so many of the developmental activities for the country was initiated. Likewise, hosting the workshop on Bhutan’s first satellite signified and auspicious beginning.

(Right) After the opening remarks by the Prime Minister, everyone gathered for a group picture. More than 100 students, around 30 officials from different offices of Bhutan and the faculty members of the CST attended the workshop.
BHUTAN-1 Workshop

(Left) Mock up of BIRDS-2 CubeSat was displayed for the participants to get an idea of how the first satellite of Bhutan looks like.

(Right) Participant from a government office of Bhutan, National Center for Hydrology and Meteorology (NCHM), Ms. Monju Subba. Presented the current utilization of satellite services for weather forecast by the center.

(Left) View of the Hall filled with participants from the front row where Prof. Cho and Dr. Pauline were seated once the presentations began.

(Right) Participant from the Regulatory Authority for Frequency use and other ICT, Telecom or media related issues in the country, Mr. Wangay Dorji. Presented about the regulatory aspects involved in venturing into the space technology.
(Left) After the Lunch break, Prof. Cho presented about the satellite technology and talked about how space can benefit a country. Gave an introduction to lean satellite and its trend. Also, talked about how a space program can be initiated in Bhutan.

(Right) Dr. Pauline presented about KyuTech. She gave a brief history of KyuTech and talked about how the international collaboration has expanded over the years. Then she described about the space related activities and facilities in KyuTech giving a background on how BIRDS program started.
After the evening Tea Break, the final session of the workshop began with 4 KyuTech students of Bhutan presenting about BIRDS-2 project and their experience of building the first satellite of the country, BHUTAN-1. *(Top left)* First, Kiran gave a brief overview of the BIRDS-2 project. *(Top center)* Then, Yeshey presented on the APRS-DP mission of BIRDS-2. *(Bottom left)* After than, Cheki took the stage to present about the Camera mission, GPS mission, AMR-MM mission and SEL mission. *(Top right)* Finally, Pooja presented about the Store and Forward mission and the GST development for the demonstration in Bhutan.
BHUTAN-1 Workshop

The Workshop concluded with a very interactive Q&A session. The Students expressed great interest in satellite technology and raised lot of curios questions about how satellites work, missions of the BIRDS-2 CubeSat and some questions were related to the space environment and space dynamics. Officials from different organizations (governmental and non-government) expressed their interest and raised their queries about the BIRDS-2 project and the satellite technology as a whole. *(Top Left)* An Electronics and Communications engineering student from CST raises his question. *(Top Center)* Dr. Pauline responding to one of the queries from the audience. *(Top Right)* Ambassador Tshewang, providing clarification on one of the question and further motivating students to work hard.

*(Below)* The Chief of the Division of Telecom and Space closed the Workshop with vote of thanks.
Closing Dinner

The Dinner was hosted in the restaurant of Hotel Damchen.

DITT hosted a simple dinner for Prof. Cho and Dr. Pauline after the end of the workshop, in the Bordering town, Phuntsholing, which is the biggest trade port for Bhutan.

© Dr. Pauline
Prof. Cho hands gift from KyuTech to Ambassador of Bhutan to Thailand, Dasho Tshewang C. Dorji

© Dr. Pauline
Prof. Cho hands gift from KyuTech to Director General of DITT, MoIC, Mr. Jigme Thinlye Namgyal
To conclude their trip to Bhutan, Prof. Cho and Dr. Pauline hiked up to the Taktshang (Tiger’s Nest) Monastery which is one of the most popular tourist destination. The Monastery is build on the face of a steep rocky cliff at about 3100 metres above sea level. It is about 900 metres above the Paro Valley where the only international airport of the country is located.
This article is excerpt from the ‘BIRDS-2 Project and Bhutan’ report authored by Bhutanese students of BIRDS-2 for the president of Kyutech. Kyutech president received an invitation for attending a dinner hosted by prime minister of Japan in honor of the prime minister of Bhutan in April 2018.

Note: Opinions expressed in this report are of the author and do not necessarily represent that of the agency or institute that they are affiliated with.
**BIRDS-2 Overview**

Joint Global Multi-Nation Birds Satellite project or BIRDS project is a cross-border interdisciplinary satellite project spanning over 2 years. The project’s mission is to support non-space faring countries and universities build and operate their first satellite. With the first satellite of the nation, the project also makes the first step toward indigenous space program in the participating countries.

BIRDS project started off with BIRDS-1 project in which five countries participated: Ghana, Mongolia, Nigeria, Bangladesh and Japan. BIRDS-2 is a second in series of BIRDS Project with 3 participating countries: Bhutan, Malaysia and Philippines. Sri Lanka, Nepal and Japan are in BIRDS-3 project. The BIRDS-2 team comprises 11 members from 4 countries (Bhutan: 4, Malaysia: 2, Philippines: 2, Japan: 3). The 3 identical 1U CubeSats each with a dimension of 10x10x10 cm and weighing about 1.1 kg, each belonging to the participating countries, have missions as shown on the right.

<table>
<thead>
<tr>
<th>Mission</th>
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<tbody>
<tr>
<td>1. Camera Mission</td>
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<tr>
<td>2. Automatic Packet Reporting System (APRS) Digi-peater (DP)</td>
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<tr>
<td>3. Remote data collection</td>
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<td>4. GPS chip functionality demonstration in space environment</td>
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<tr>
<td>5. Magnetic Field Measurement</td>
</tr>
<tr>
<td>6. Single Event Latch-up (SEL) mission</td>
</tr>
</tbody>
</table>
Flight model of 3 satellites in Kyutech. Official name of satellites (from left to right): BHUTAN-1, MAYA-1 and UiTMSAT-1
3 Bhutanese students, who are enrolled in Masters course, joined the BIRDS-2 project from the inception in November 2016, while one more student joined in October 2017 and got involved in later stages of the project. Over the due course of project, students have actively engaged in all stages of satellite development. First stage being Mission Definition Review (MDR) in which the team members decided on the satellite missions. It was then followed by Preliminary Design Review (PDR) where students chose sub-systems and missions as their primary work besides engaging in overall project works. Bhutanese students have undertaken roles in sub-system and missions of a satellite development as listed on the right.

A delegation from Bhutan along with other stakeholders from Malaysia and Philippines, attended the next phase of review called Critical Design Review (CDR) of satellite development which was held in Kyutech in July 2017.

1. On-Board Computer Sub-system
3. Attitude Determination and Control Sub-system
4. GPS Mission
5. Magnetic Field Measurement Mission
6. Ground Station Terminal (GST) Development.
1. **BIRDS-2 project has opened up discussion of space in the country**

The vision for Bhutan’s first satellite and involvement in the BIRDS-2 program emanated from His Majesty The King of Bhutan. The 4 students working on the BIRDS-2 project are civil servants working in the Division of Telecom and Space under Department of Information Technology and Telecom (DITT) which is under Ministry of Information and Communication (MoIC) in Bhutan. Students will return to Bhutan after completion of their Masters degree to carry-out and enhance the space activities in the country. Royal Government of Bhutan has been very supportive of Bhutan’s involvement in BIRDS-2 project. DITT organized ‘BHUTAN-1 Workshop’ in one of the engineering colleges in the country in March 2018. The workshop was graced by prime minister of Bhutan. Prof. Cho, Dr. Pauline and 4 Bhutanese students from Kyutech attended the workshop.

The workshop brought in different stakeholders that have relevance to space activities together for the first time in the country. Students from the college also attended the workshop and interacted at length with 4 students of Kyutech. The BIRDS-2 project and the workshop have also gained a lot of media attention making Bhutan known to international space community.
2. Technical human resources in the country

BIRDS-2 project has given students hands-on experiences on building satellites. Students were involved in actual satellite development from design, to construction, to testing. Through BIRDS-2 project, Bhutan now has technical human resource, albeit small, to carry out small space missions to benefit the country in different areas. In future, Bhutan can expand its technical human resource in space.

3. Human network at the international level

The project not only provides a platform for the developing nations to get engaged in the process of developing and operating a satellite but it also creates an opportunity for international collaboration. The BIRDS program provides the platform to establish the human network and collaboration among different countries as follows:

• The students from different nations work as a single team to design, build and operate the CubeSats.
• The CubeSats are operated through the constellation of ground stations with a ground station located in many participating countries.
4. Students can form core team in taking ahead Bhutanese space program

Besides working on satellite, students have to attend lectures and other laboratory obligations. Among lectures, the lecture on ‘Space Law and Policy’ have exposed students to different aspect of the space to that of the engineering. Students also underwent Space Policy planning exercise along with participants from other countries under supervision of Prof. Cho. Obtaining licenses for using frequencies is crucial before the launch of satellite. Students also got involved in frequency coordination works with other relevant national and international agencies. With these experiences and knowledge, students can actively lead and participate in formulating the space program of Bhutan.

Bhutanese team (from left to right): Pooja Lepcha, Kiran Kumar, Yeshey Choden and Cheki Dorji

END OF REPORT
BY
CHEKI
BIRDS-3 Data Collection Mission
Updates From Sri Lanka

By. Tharindu & Sampath

Arthur C Clarke Institute for Modern Technologies
Frequencies of the Sri Lankan remote stations will be in 433MHz band.
For BIRDS-3 satellite, RFM95/96/98 series LoRa modules will be used but Sri lankan remote stations will use Ra-02 LoRa module.
LoRa Modules Before Testing
Sri Lankan Team

This team is currently working on Sri Lanka’s BIRDS-3 Main Ground station and Data Collection Mission remote stations.

Team Members
1. Kaveendra Sampath
2. Dinusha de Silva
3. Jayakamal Abeysekara
4. Chaminda Jayalath

Arthur C Clarke Institute for Modern Technologies
Sri Lanka
18. BIRDS-3: Activities during April - May 2018, by Abhas

Tharindu working on BBM

Kim-Sensei’s session

Antenna Deployment Design by Makiko and Sasaki

Azami (BIRDS-2) helping BIRDS-3

Documenting issues while BBM process

BIRDS-3 New Year Dinner on April 14 (hosted by Dulani)
BIRDS-3 members completed Preliminary Design Review (PDR), a critical milestone, on April 26th 2018 and are now in the Engineering Model (EM) Phase where the Bread Board Model design will be made into EM and will all be fitted inside the structure. The team plans on doing the EM environmental testing from the beginning of July.

BIRDS-3 team would like to thank both BIRDS-1 and BIRDS-2 teams for being extremely supportive during the PDR prep.
19. BIRDS-3: Media watch in Nepal, by Abhas

In Nepal Academy of Science and Technology (NAST)’s weekly program on national television, Nepal TV, Abhas Maskey (BIRDS-3) gave an interview to explain the philosophy of the BIRDS-3 project, why Nepal needs it and how Nepal can move forward into the future. In the interview, Abhas also explained the challenges in getting funds for BIRDS-3 and made suggestions to improve the process in the future. The interview was aired on April 14, 2018.
Frequency Coordination
(Japan case)

Makiko Kishimoto
May 14th 2018
Satellite part

1. When using the amateur frequency, satellite project member need to apply for the propose satellite frequency to IARU and JARL which are the amateur radio organization, and get permission to use the amateur radio frequency band.
   → Amateur radio frequency application (IARU, JARL)

2. Submit the API document to ITU which is the international frequency allocation organization. So, your propose satellite frequency will not cause interfere to other satellites and radio stations.
   (Request will be made by MIC.)
   → International frequency allocation (ITU, MIC)

3. It is necessary to make the similar frequency allocation for domestic as well as international frequency allocation of 2.
   → Radio station license application (MIC, General Communication Bureau)

*MIC: Ministry of Internal Affairs and Communications
*IARU: International Amateur Radio Union
*JARL: Japan Amateur Radio League
*ITU: International Telecommunication Union
*API: Advanced Publication Information
To launch your satellite

**Ground Station part**

1. Apply for a ground station license following the domestic radio law.
   → Radio station license application
   (MIC, General Communication Bureau)

Satellite frequency coordination request document

Fill in frequency, communication method to use, mission of satellites, information of Ground Station and things like that.
Satellite frequency coordination request (1)

1. Prepare the frequency coordination request document
2. Request the frequency coordination review to JARL
3. Submit the satellite frequency coordination request document to IARU
4. Review by JARL and domestic affiliated organization
5. Review by JARL, IARU (Japanese members), JAMSAT
6. Review by IARU
7. Notification of amateur satellite frequency coordination from IARU

To: JARL
Email: lab@jarl.org
Submit the Frequency application document according to IARU specified format

To: IARU Advisor
Email: satcoord@iaru.org
CC: hans@intekom.co.za

1~3 months

2~4 months

Applicant responsibility

IARU responsibility
Satellite frequency coordination request (2)

- **Submit the Frequency adjustment material to MIC**
- **Review and adjustment by MIC** (1 month)
- **Submit the API to ITU**
  - After submitting to ITU, cannot change the API
- **Processing in ITU**
- **Publish API**
  - After publishing API, Satellites are able to be delivered to JAXA
  - MIC is the responsible agency in Japan for submit the API to ITU
- **Receive comments submitted from other countries**
- **Adjustment with the country submitted opinions**

**Color codes**
- Applicant responsibility
- MIC responsibility
- ITU responsibility
Satellite frequency coordination request (3)

- Make the notification document
- Submit the notification document to MIC
- Submit the notification document to ITU
- Processing in ITU
- Publish the notification document
- Satellites launch and Initial operation
- Notification of activation

No problem even if your satellite launch before submitting the notification document.

- Applicant responsibility
- MIC responsibility
- ITU responsibility
Radio station license application process

1. Consultation of application contents
2. Submit application for station license
3. Delivery of preliminary license notice
4. Submit the list of ground station operator
5. Request for the completion inspection (before/after launch)
6. Report of the completion inspection
7. Ground station license grant

GS Inspection by MIC

Satellite and Ground Station

END OF FREQ. COORD. ARTICLE.
21. BIRDS-3: PDR (Preliminary Design Review)

BIRDS-3 PDR

Pooja Lepcha
BIRDS-3 presented their PDR on 26\textsuperscript{th} April, 2018 from 13:00 to 16:00 in Cho Lab Seminar room.

The PDR started with the Project Manager (Abhas) giving the introductory remarks and followed by the team members presenting their respective missions and subsystems.
The PDR turned very interesting as the Sensei’s and the students wracked their head in understanding the BIRDS-3 system. The main focus was however on its difference from the BIRDS-2 system and the improvements made from them.

Some serious discussion during the PDR

Participants listen carefully to the presentation

Cho sensei and Kim sensei

Adrian from BIRDS-2 asking questions

Maeda sensei taking notes of important points
A light refreshment was organized by BIRDS-3 with an initiative from the Project Manager for the PDR participants. It was to express the gratitude for joining the PDR and giving valuable comments. BIRDS-1 and BIRDS-2 joined the party.

It was a very interactive party.
Subsystem Level Interaction: Each responsible person for each subsystem seemed to talk to their senpai who handled the subsystem in BIRDS-2 before.

Camera subsystem: Abhas and Azami

ADCS: Dulani and Cheki

Structure: Sasaki and Uemura; Kakimoto and Kiran

Communication subsystem: Tharindu and Adrian

Antenna: Makiko and Syazana

Maisun (BIRDS-1) and Adrian (BIRDS-2) for Communication subsystem
5月に入って、BIRDS-3の熱解析モデルを作成しました。Thermal Desktopというソフトウェアを用いて解析を行っています。

このモデルは、BIRDS-1の解析モデルをもとに、構造をBIRDS-3用に置き換え、部品間の接触条件や輻射条件を加えたものです。

右の図は、軌道上の熱入力の条件を与えて実際に解析を行ったものです。現時点では、接触の条件が正しいとは言いきれないため、モデルとしては未完成ですが、今後熱試験を行い、このモデルの信頼性の向上を図ります。

以前、別の衛星の熱設計を行った際、接触条件を出すのがかなり大変だったため、今回はずすなりうまくいくことを願います。。。
Double article by Dulani of BIRDS-3:

• Summary of Special Training Sessions (STS) of BIRDS-3

• New Year Celebrations of Nepal and Sri Lanka
Special Training Sessions of BIRDS 3

In the beginning we had training sessions for the whole BIRDS-3 team.

Currently members who are involved in specific subsystems are taking special training sessions from previous BIRDS members who were engaged in those subsystems.

The highlighted training sessions are the latest what BIRDS3 members took.
Sri Lanka’s and Nepal’s New Year Celebrations

Sri Lanka’s and Nepal’s traditional new year was held on 14th April 2018. BIRDS3 members arranged the dinner to celebrate this special day together.

Milk rice (Sri Lankan’s main dish in new year)

A picture taken by Makiko

A photo taken of dishes while we were eating

Before we start eating
熱サイクル試験

Glue missionで接着剤を選定するときの基準として環境試験を実施します。環境試験にはランダム振動やサインバーストなどの振動試験と熱サイクル試験や熱真空試験の熱試験が主にあります。今回は熱サイクル試験について話していきます。

衛星は軌道上に打ち上げられたのち、熱サイクルがかかります。接着剤に関しては温度範囲により剥離したり、熱膨張により張り付けていた太陽電池に不具合が起きたりする可能性があります。熱サイクル試験はこの耐性を見るために実施されます。

熱サイクル試験は温度を調べるための熱電対と熱膨張率を調べるための歪みゲージを使って実験をしました。サンプルは写真のようにアルミパックによって袋閉じをしました。中に窒素を充填することで湿気をなくすことが出来ます。

100サイクルした後結果をサンプルを確認しましたが、変化は見られませんでした。引き続きこの熱サイクル試験をしていく予定です。
End of this BIRDS Project Newsletter
(ISSN 2433-8818)
– Issue Number Twenty-Eight

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