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BIRDS Project Newsletter

Issue No. 26
(14 March 2018)

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

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

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

Space Engineering International Course

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

Table of Sections

The Guest Box

From Nepal (BIRDS-3)

This picture shows the typical Nepali vegetarian culinary **“Dal-Bhat”,** prepared at home on the auspicious occasion of the World Women Day on 8th March 2018. This meal, eaten normally twice a day, consists … continued on Page 96.

- text and photo by Sarita Shrestha Maskey

01. Article about “BRAC ONNESHA” (BIRDS-1 satellite) appears in QS WOWNEWS

QS WOWNEWS is published by **QS Asia**

Thanks to Antara (at BRAC Univ.) for bringing to our attention this article.
See the article on the next page.

Title of the article is
“BRAC Onnesha: dawn of space in Bangladesh”

An article about BIRDS was also published by BRAC University

BRAC Onnesha: dawn of space age in Bangladesh

BRAC Onnesha satellite handover Ceremony at Kyushu Institute of Technology, Japan

Bangladesh – In 1957, when the former Soviet Union entered the space age by launching Sputnik-1, the world's first satellite, the tiny device's beeping signal from space sparked an obsession in science and engineering that changed the world. After 60 years, launching a satellite for many big player countries is a routine matter; however, for nations that are developing, due to cost and technical limitations, reaching into and exploring space is still a challenge. BRAC Onnesha, the first nano-satellite of Bangladesh that was launched into space, has broken that barrier. This CubeSat bucked the odds and opened a new horizon to the young generation of Bangladesh.

BRAC University has taken a significant initiative to introduce Bangladesh into the realms of space exploration. BRAC Onnesha is a part of the "The Joint Global Multi-Nation Birds Satellite project" or simply "Birds project". This cross-border interdisciplinary satellite project for non-space-faring nations was initiated by the Kyushu Institute of Technology in Japan, a trusted "tomodachi" (Japanese word for friend) of Bangladesh.

The idea of a nano satellite was conceived in 2013 during a seminar by Dr Arifur Rahman Khan. Ultimately, a contract was signed on 15 June 2016 between Kyutech and BRAC University. Abdulla HilKafi, Raihana Shams Islam Antara and Maisun Ibn Monowar, three BRAC University graduates, designed and crafted BRAC Onnesha. The project was challenging for them, considering everything from financial problems to social restrictions.

The development duration, which was 14 months, included designing, building and testing the following JAXA standards. The device was reviewed by NASA and JAXA. After being accepted by these two entities, the satellite was handed over to Dr Syed Saad Andaleeb, vice chancellor of BRAC University, on 8 February 2017, by Kyutech's President Yuji Oie and Dr Mengu Cho, principal investigator of BIRDS Project.

On 4 June, all of Bangladesh was waiting expectantly to witness the making of history by BRAC Onnesha. The launch vehicle was SpaceX FALCON 9. BRAC Onnesha was carried to ISS during the CRS-11 mission, which was the first time that a Dragon spacecraft was reused. It was launched from NASA's Kennedy Space Center pad 39A, and was the 100th launch from this pad. After successful launch the cargo vehicle was snared at 13:52 UTC by Canadarm2, operated by Peggy Whitson and Jack Fischer. BRAC Onnesha started orbiting the Earth from the International Space Station on 7 July 2017, 3:10 pm. The First signal from BRAC Onnesha was received on 8 July 2017 at Kyutech.

A facility has been built at BRAC University to communicate with BRAC Onnesha which is the first ever student-built Satellite-ground station in Bangladesh. The team of BRAC Onnesha is planning to form a "centre of excellence" to build the next satellite in Bangladesh.

"Bangladesh will remember their achievement forever," stated the science and technology minister of Bangladesh, Architect Yeafesh Osman. BRAC Onnesha is not just a satellite; it is an inspiration for the nation's youth. This is only a beginning and will grow into a space research programme that will hopefully attract more brilliant minds in Bangladesh to the idea of space exploration.

View the above article at:
https://www.qs-asia.com/e-book/wownews/files/assets/basic-html/index.html#37

BRAC UNIVERSITY
Inspiring Excellence

Find

About Academics Admissions Ai

2017 GEDC Airbus Diversity Award for Kyushu Institute of Technology's BIRDS satellite project under which BRAC Onnesha has been built

Publish Date: February 19th, 2018

AIRBUS, the worldwide leader in aeronautics, space and related services and the Global Engineering Deans Council (GEDC), the leading global organization for engineering education, have announced the recipient of the **2017 GEDC Airbus Diversity Award.** Japan's Kyushu Institute

View this BRAC article at:
http://www.bracu.ac.bd/news/2017-gedc-airbus-diversity-award-kyushu-institute-technologys-birds-satellite-project-under

BIRDS-3

Two media items from Nepal -- the next two pages

[submitted and translated by Abhas on 24 Feb 2018]

अब नेपालको पनि आफ्नै भू-उपग्रह

खगेन्द्र भण्डारी | *काठमाडौं*

नेपालले अर्को वर्षभित्र आफ्नै भू-उपग्रह प्रक्षेपण गर्ने तयारी थालेको छ। नेपाल विज्ञान तथा प्रविधि प्रज्ञा प्रतिष्ठान (नास्ट) ले जापानको एक कम्पनीसँग सम्झौता गरी आफ्नै भू-उपग्रह स्थापना गर्ने प्रक्रिया अगाडि बढाएको हो।

भू-उपग्रहसम्बन्धी अध्ययन/अनुसन्धान गर्न नास्टले माघ ३ गते जापानको क्युटेक (क्युस इन्स्टिच्युट अफ टेक्नोलोजी) सँग सम्झौता गरेको नास्टका उपकुलपति डा. जीवराज पोखरेल बताए।

नास्टले यो इन्स्टिच्युटमा भू-उपग्रहसम्बन्धी अध्ययन गर्न दुई वर्षका लागि दुई जना इन्जिनियरलाई जापान पठाउने भएको छ। नास्टले इलेक्ट्रोनिक इन्जिनियर हरेराम श्रेष्ठलाई जापान पठाउन छनोट गरिसकेको छ भने अर्का एक प्राविधिकको छनोट जारी राखेको छ।

नेपालमा भू-उपग्रहबारे जानकार जनशक्ति नभएका कारण अध्ययनका लागि प्राविधिकलाई जापान पठाउन लागिएको हो। दुई जनामध्ये एक जनालाई इन्स्टिच्युटले पूर्ण छात्रवृत्ति दिने भएको छ भने अर्का एक जनाको

> सन् २०१९ अगस्टमा अमेरिकाको फ्लोरिडाबाट प्रक्षेपण गरिने।

खर्च सरकारले नै बेहोर्नुपर्नेछ। नास्टले यसका लागि अर्थ मन्त्रालयसँग करिब १ करोड ८० लाख बजेट माग गरेको छ। तर, अर्थले भने बजेट दिन स्वीकृति जनाए पनि दिइनसकेको उपकुलपति पोखरेलले जनाए। उनले भने, 'तीन महिनाअघि नै बजेट मागेका हौं, अर्थले दिन्छु भनेको हो तर बजेट आएको छैन।'

विज्ञान तथा प्रविधि मन्त्रालयका प्रवक्ता सहसचिव सुरेन्द्र सुवेदीले बजेटका लागि अर्थसँग छलफल भइरहेको बताए। उनले भने, 'भू-उपग्रहका लागि हार्डवेयरतर्फ सहयोग गर्छौं, अध्ययनका लागि करोडभन्दा बढी बजेट विनियोजन गर्न सहज हुँदैन कि भन्ने अर्थको मनसाय देखियो।'

नास्टकै पहलमा जाइकाजस्ता संस्थासँग छात्रवृत्तिका लागि पहल गर्न अर्थ मन्त्रालयले जोड दिएको छ। यसका लागि अर्थले स्वीकृति दिने जनाएको छ। नास्टले बजेट आउन ढिलाइले प्राविधिकलाई अध्ययनका लागि जापान पठाउन ढिलाइ भएको गुनासो गरेको छ।

नास्टका उपलकुलपति पोखरेलका अनुसार अर्को वर्षको अगस्टमा भू-उपग्रह प्रक्षेपण गर्ने तयारी भइरहेको छ। अमेरिकाको फ्लोरिडाबाट सानो साइजको भू-उपग्रह नेपालके पहिलो उपग्रह हुनेछ।

विज्ञान मन्त्रालयका प्रवक्ता सुवेदीले सानो भए पनि अन्तरिक्षमा उपस्थिति जनाउने भएकाले महत्त्व धेरै भएको प्रतिक्रिया दिए। उनले भने, 'यो १० केजीभन्दा सानो हुनेछ तैपनि भू-उपग्रहको करिब ६० वर्से इतिहासमा नेपालको उपस्थितिले सकारात्मक सन्देश जान्छ।'

सानो आकारको यो भू-उपग्रहले डाटा संकलन र तस्बिर खिच्न सकिने नास्टको विश्वास छ। नास्टले गर्ने अनुसन्धानका काममा यसले ठूलो सहयोग पुग्नेछ। अहिले नेपालको आफ्नै भू-उपग्रह नहुँदा टेलिकम्युनिकेसन र प्रसारणसम्बन्धी सेवामा विदेशीको भर पर्नुपरेको छ।

Annapurna Post
Date: 24th February, 2018

Translation:

Nepal to have it's own satellite

Key points:

1. NAST in collaboration with Kyushu Institute of Technology
2. NAST to send two students which includes Mr. Hari Ram Shrestha of NAST through Kyutech's Scholarship
3. States that satellite will be launched until 2019

http://annapurnapost.com/news-details/91755

अब नेपालको आफ्नै भू-उपग्रह

Setopati.com (viral news media)
Date: 24th February, 2018

Translation:

Nepal to have its own satellite (They sourced it from Annapurna Post)

Key points:

1. Attributes its source to Annapurna
2. NAST in cooperation with Kyutech is going to be building a satellite and launching it to space by 2019

https://setopati.com/from-paper/135758

“The best way to learn something is to teach it.”

-- Dr. Robert MacNelis, high school mathematics teacher

This gentleman taught me high school math during 1975-1976 at Parkdale High School, Riverdale, Maryland, which is in the northern suburbs of Washington, DC, on the east coast of the United States.

The Editor

04. Some key slides from the January SEIC lecture by Prof. Jordi of Cal Poly

Prof. Jordi Puig-Suari

21. Prof. Jordi Puig-Suari delivers special lecture to the students of SEIC and BIRDS

Title of the lecture

"CubeSats as workforce development tools"

Abstract

CubeSats have become the standard for student satellite development activities around the world. Initially, these small space craft were viewed as ideal training programs for future space professionals. However, their influence has expanded beyond education with the development of a new industrial ecosystem. In addition, their impact is moving beyond the space industry and has the potential to affect many areas of technology. The presentation will explore the role of CubeSats as workforce development tools specially in countries without an existing space industry.

Cont'd on the next 2 pages

← This article appeared in this newsletter two issues ago. It is about his special SEIC lecture at Kyutech.

In this section, I present some of the key slides from this lecture. He makes some really good points about CubeSats as workforce development tools.

See the next six pages.

- G. Maeda

CubeSat Technology

From lecture slides of Prof. Jordi on 25Jan2018 at Kyutech

Integrated Systems Training Tool

Training Potential

From lecture slides of Prof. Jordi on 25Jan2018 at Kyutech

Training Tool

Flexible High-Tech Workforce

Small Sats fulfill training needs

From lecture slides of Prof. Jordi on 25Jan2018 at Kyutech

This is the crux of his lecture I believe. By doing a small sat project students acquire the right skills to work in a vast range of industrial workplaces – from manufacturing to IT firms such as Google, Apple, Facebook etc., and, of course, to space.

- G. Maeda, The Editor

- Multi-disciplinary Project
- High-Tech Integrated System
- Hands-on Project (must build something)
- High Quality Manufacturing
- Policy & Documentation Requirements
- High motivation (SPACE!)

Additional Benefits

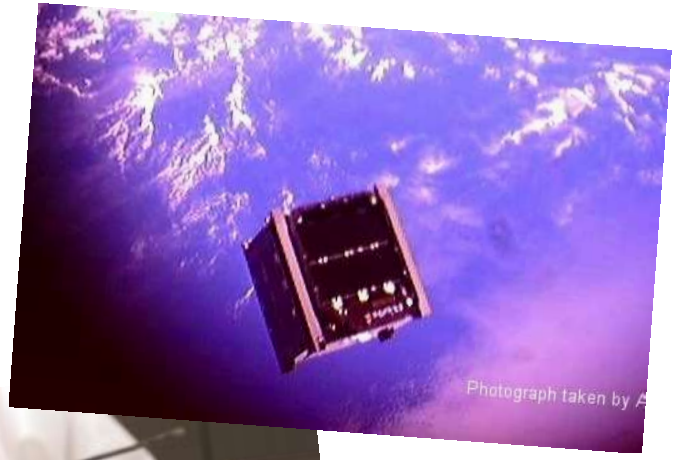
From lecture slides of Prof. Jordi on 25Jan2018 at Kyutech

- Exciting projects for Educators
  - Retain experts
- National Pride / Political PR
  - Funding opportunities
  - Science outreach
- Many Opportunities for Collaboration
  - Supportive community
- Emerging Industry
  - Nobody is far behind

Options for New Space Players

From lecture slides of Prof. Jordi on 25Jan2018 at Kyutech

- Invest in New Space infrastructure
  - Low barrier to entry
  - Commercial technology base
  - Low to medium performance
  - Workforce development
  - Short schedule
- Modest short term results
- Great long term potential
  - Including new local industry



Key Points

From lecture slides of Prof. Jordi on 25Jan2018 at Kyutech

- Small Spacecraft are high-tech training tools
  - Systems view is critical
- Students prepared for all high-tech fields
  - Flexible investment
- Stat-ups generated from student teams
  - Global phenomenon
- Utilize local areas of expertise
  - Technology or Problem/Solution ID
- Low barriers to entry
  - New players can compete

Thank you Prof. Jordi for an outstanding talk for our SEIC students – who have to make career choices. Luckily, they are well equipped for many kinds of well-paying jobs.

- G. Maeda, The Editor

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

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

Cont'd on the next page

Venue: Lobby of the Int'l Dorm

Birthday Boy and Girl

BIRDS-3 Team:
The monthly pot luck dinner is a fabulous tradition – keep it up til the end of the project.

- G. Maeda, Editor

06. An inspiring TED talk by Danielle Wood of MIT

Dear Colleagues,
I wish to share TEDex talk of Dr. Danielle Wood with you.
She has an excellent track record in research to foster space technology development for developing countries.
and currently lead the Space Enabled research group at MIT Media Lab.
The talk is here:
https://www.youtube.com/watch?v=5RAJvzV9j-o

She mentioned 2 former SEIC students at the end of her talk.
<Hala and Adel>

Best regards.

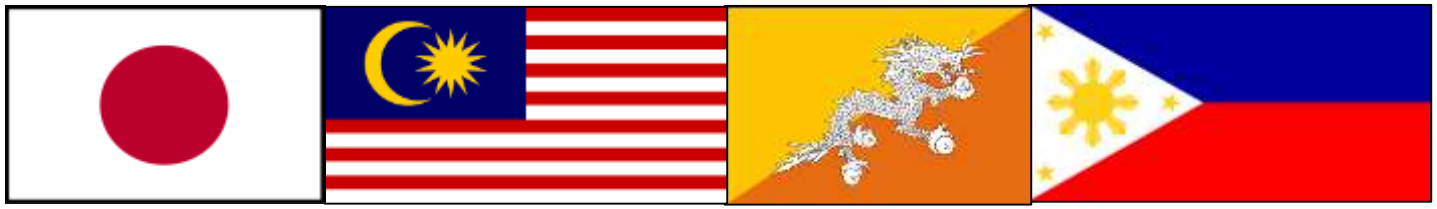
Tejumola Taiwo
Phd candidate
Laboratory of Spacecraft Environment Interaction Engineering
Kyushu Institute of Technology
1-1 Sensui Tobata-ku Kitakyushu 804-8550 JAPAN

07. BIRDS-2 press conference: Material presented by Joven, Project Manager

The next 20 pages constitute the material presented by Joven (BIRDS-2 Project Manager) during the **BIRDS-2 press conference** of 26 February 2018 at Kyutech.

It is a good summary of the BIRDS-2 Project, which involves Philippines, Malaysia, Bhutan, and Japan.

Joint Multi-nation BIRDS-2 Project



BIRDS-2 Press Conference
Japan Malaysia Bhutan Philippines
13:00 February 26, 2018

Collaboration - Education - Support – Building
Laboratory of Spacecraft Environment Interaction Engineering (LaSEINE)
Kyushu Institute of Technology

BIRDS-2 Project Overview

- Birds Satellite Project is a cross-border interdisciplinary satellite project for non-space faring countries.
- During 2 years project, students shall learn to design, develop and operate 3 units of identical 1U Cube Satellites (1kg, 10 cm cubic) belonging to the three participating countries and operated spread across the world to form a constellation of that will be operated in 10 networked ground stations.
- 11 students from 4 participating countries namely Japan, Philippines, Bhutan and Malaysia who belong to Graduate School of Engineering of Kyutech and enrolled as a Bachelor, Master and Doctoral degree students in Space Engineering International Course are executing this project with the support of faculty members.
- This projects provide great leverage to students from developing nations for hands on satellite project.

Main Objectives of BIRDS Project

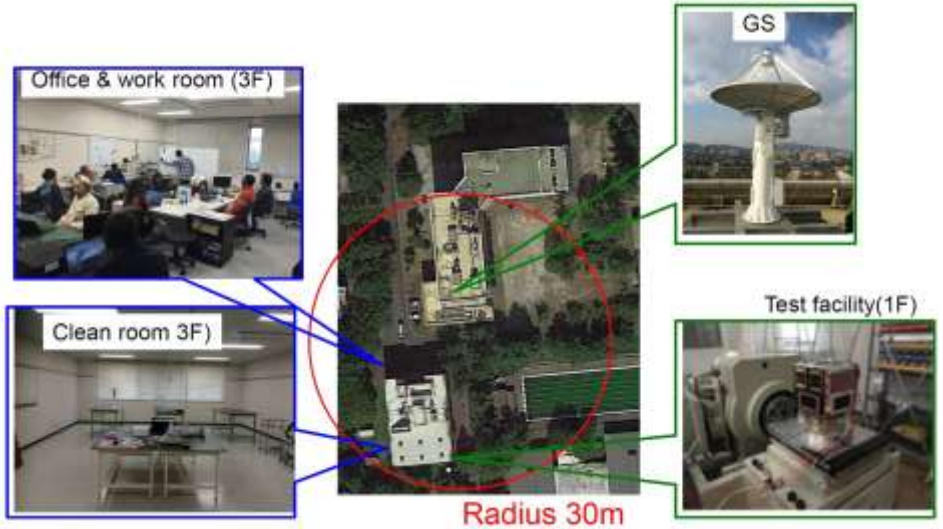
- A. To provide an opportunity to learn the Entire Satellite System Cycle
- B. To lay down the foundation of the sustainable space program.
- C. To create International Networks of Ground Station to assist the infant space program of participating country.

Learn the satellite development in a lean concept

PROCESS MUST BE SIMPLE

USE HERITAGE SO THAT TIMELINE IS SHORT

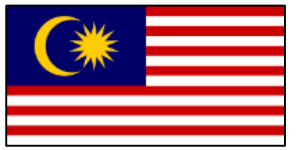
USE COTS COMPONENT FOR
LOW COST DEVELOPMENT



WORK AREA IS NEAR AS POSSIBLE

Source: Pictures courtesy of Google Image

BIRDS-2 Team



2 - Philippines (1 Masters, 1 PhD)

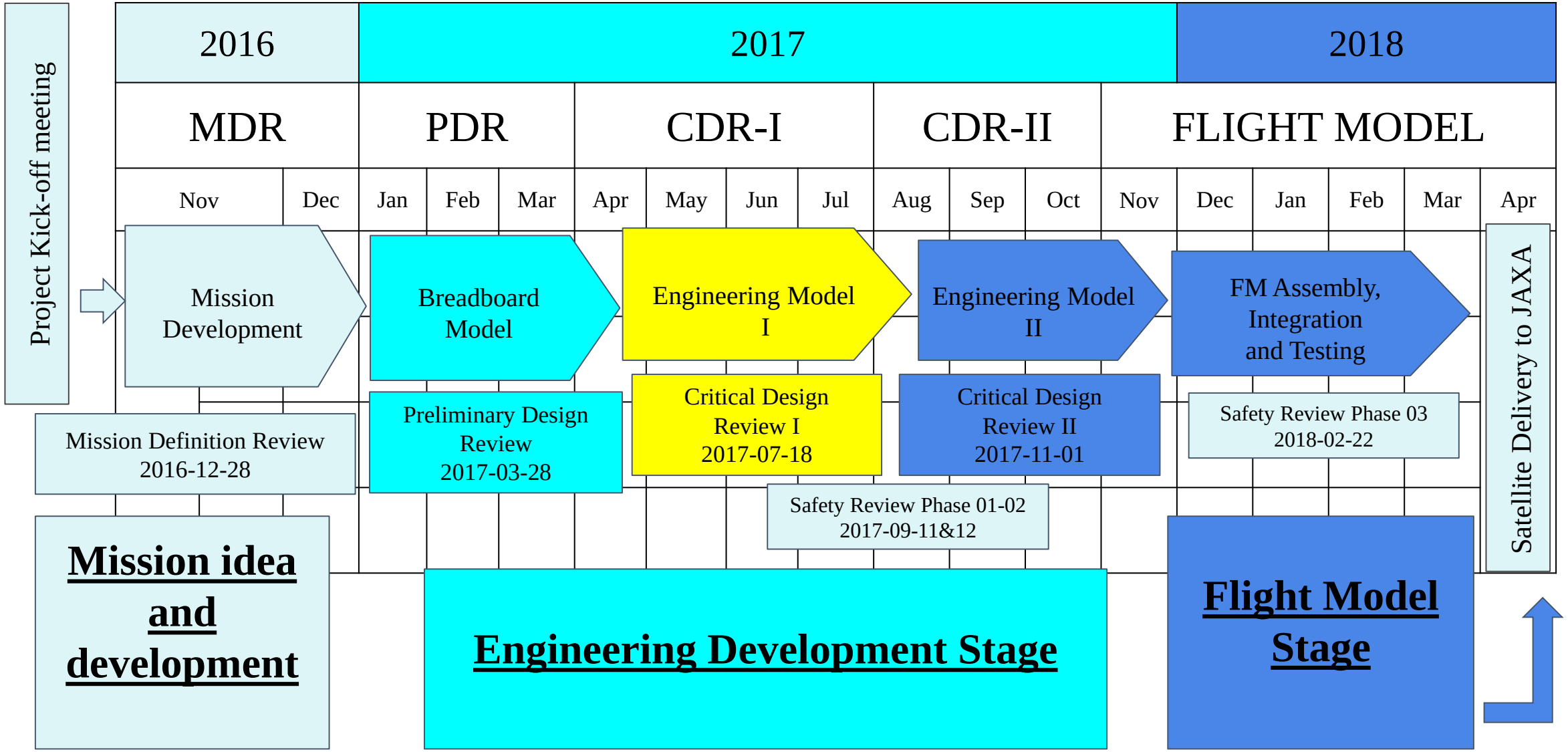
2 - Malaysia (1 Masters, 1 PhD)

4 - Bhutan (3 Masters)

3 - Japan (2 Masters, 1 Bachelor)

Total = 11 members

BIRDS-2 Project Schedule



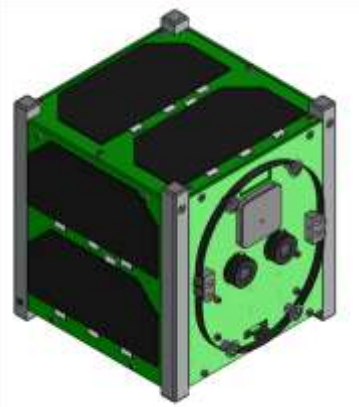
BIRDS-2 Flight Model

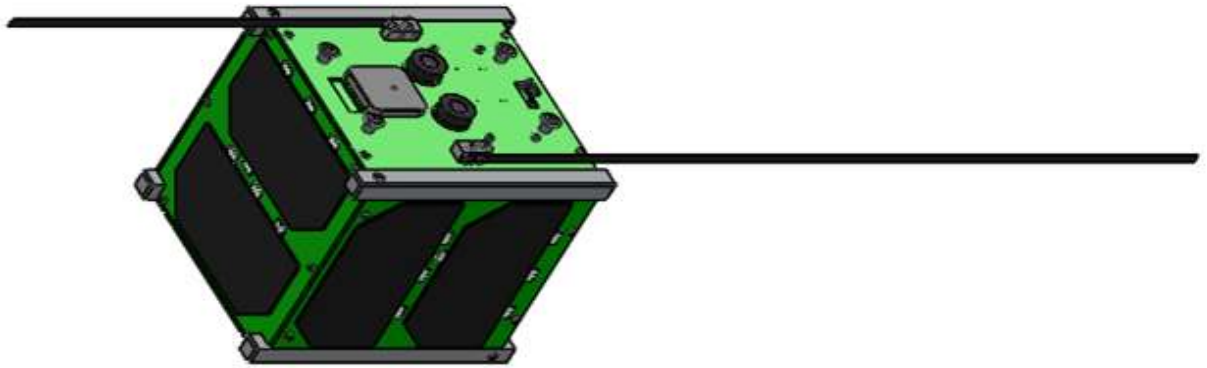
BHUTAN-1 MAYA-1 UiTMSAT-1

Size	100 mm x 100 mm x 113.5mm
Weight	1.11 kg
Output Power	UHF = 0.8 W VHF = 0.5 W Beacon = 0.1 W
Development Time	1 year and 3 months
Current Status	Flight Model Finished
Missions On Board	• Earth Observation (Camera Mission) • Technology Demonstration • Data Gathering in space for scientific research
Delivery to JAXA	April 1, 2018

Satellite Onboard Missions

- Automatic Radio Packet Service - Digipeater (APRS-DP)
- Store and Forward
- Camera Mission
- Demonstration of COTS GPS as a Mission
- Anisotropic Magneto Resonance Magnetometer (AMR-MM)
- Detection of microprocessor anomaly due to space radiation (Single-Event Latch up)





Summary

- CubeSat's will make a constellation in LEO on 3rd Quarter of 2018
- Take pictures of the home country, performing technology demonstration and gathering scientific data in space using the established 7 ground station network
- Additional 3 ground stations from Birds-2 making 10 GS network
- Operate Uplink and Downlink as possible at anytime satellite passes each respective ground stations

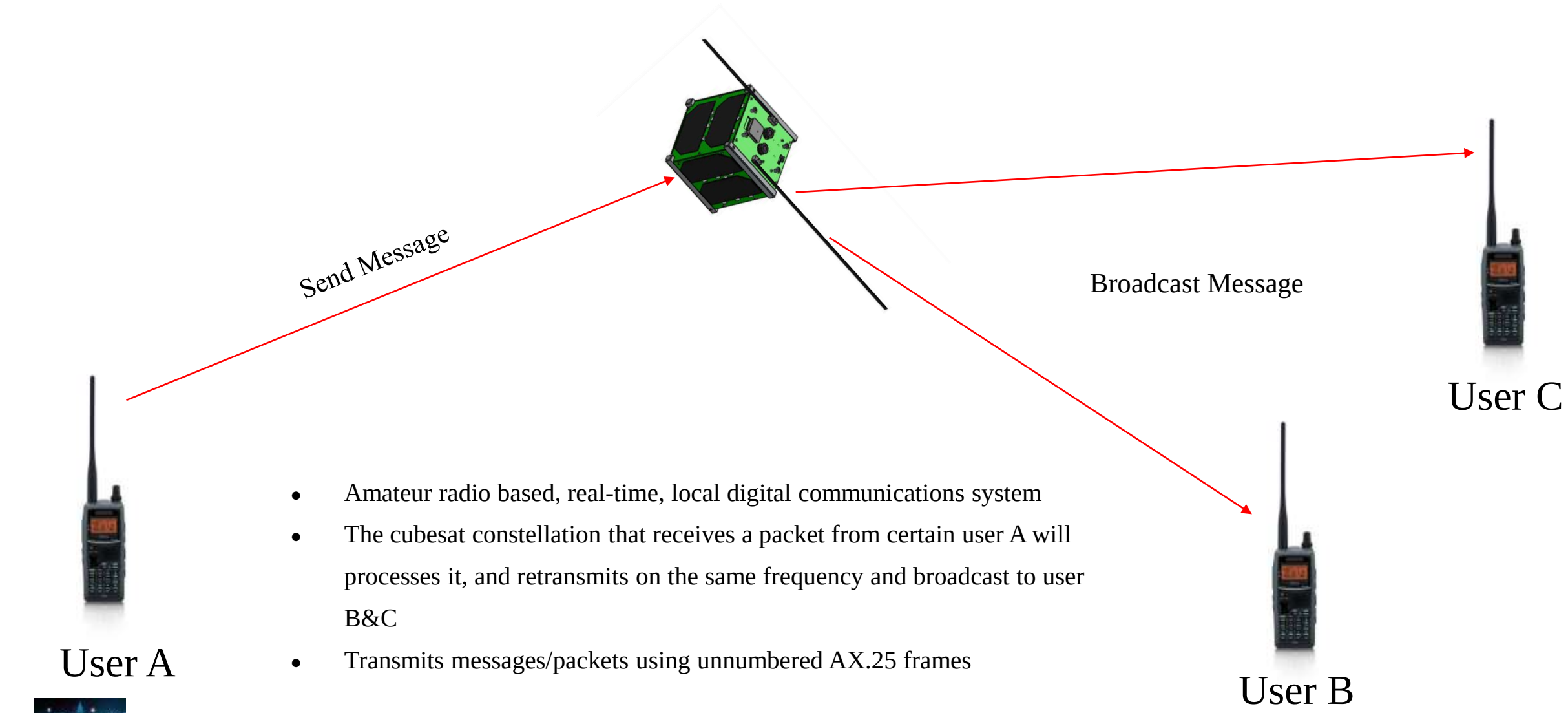
End of Press Conference Presentation

Thank you

APPENDIX

Brief details of each mission

Automatic Radio Packet Service - Digipeater

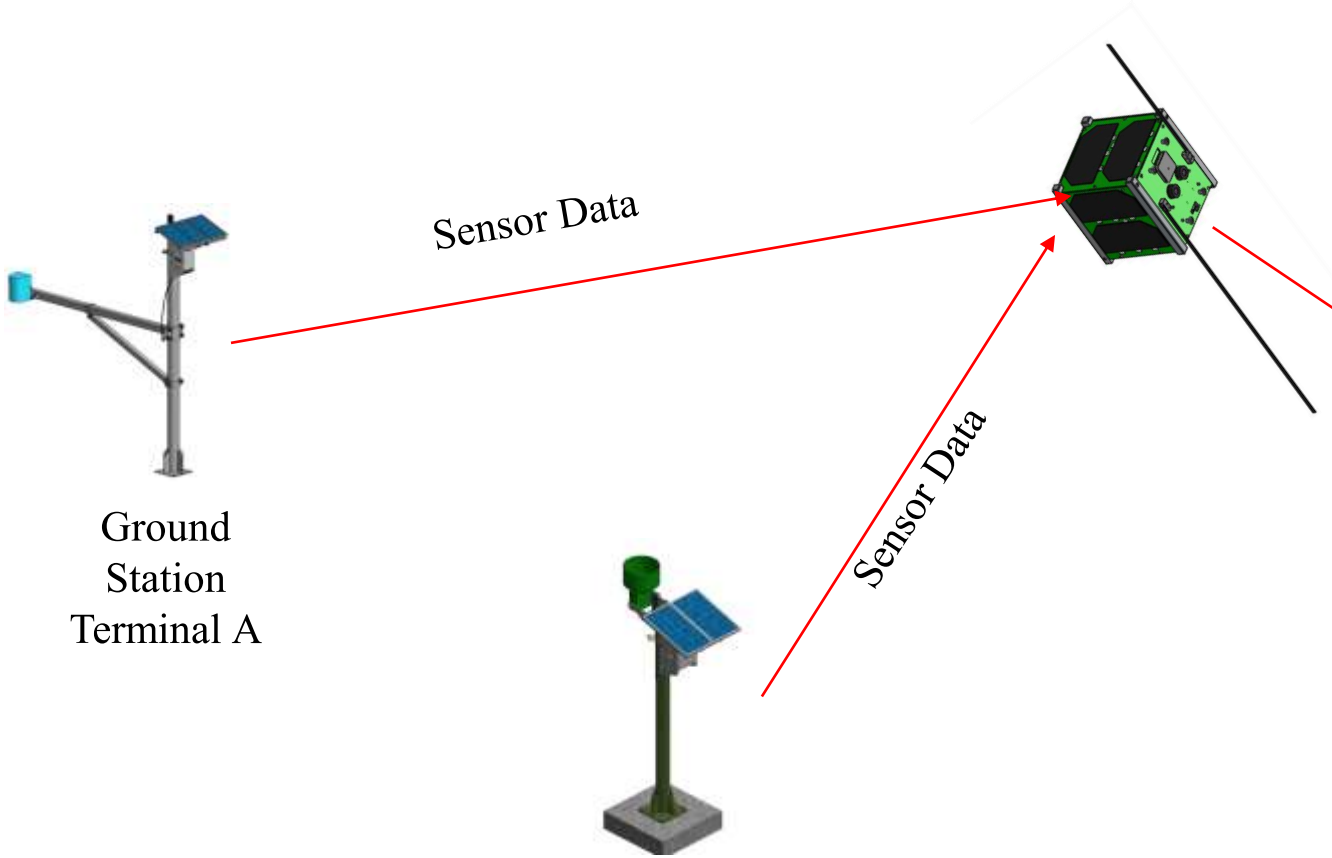


- Amateur radio based, real-time, local digital communications system
- The cubesat constellation that receives a packet from certain user A will processes it, and retransmits on the same frequency and broadcast to user B&C
- Transmits messages/packets using unnumbered AX.25 frames

APRS-DP Application

- Provide real time digital communication service to amateur community
- Provide alternative communication services during emergencies
- Use as a tool to educate general public and young people about amateur and radio communication

Store and Forward Mission



- A "spacecraft that receives and stores messages while over one part of the earth and downloads them later over another part of the globe."
- Common Applications
  -Remote data collection from ground terminals/sensors
  -File/data transfer and email forwarding

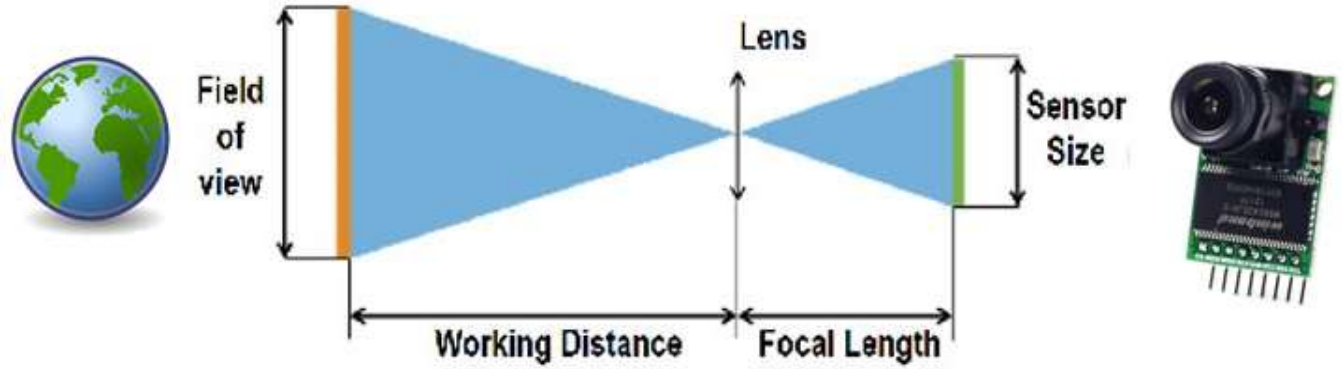
Camera Mission

- The purpose of the CAM mission is able to capture images of each country (Japan, Philippines, Bhutan and Malaysia) and other BIRDS member country as well.

- We divided the mission into three success levels;
  - Minimum - Capture images from Earth's surface
  - Full - Take picture of the 4 countries in desired high resolution

- Use 2 OVCAM cameras as payload; primary camera (Wide-angle lens), and secondary camera (Narrow-angle lens).

Camera Resolution



Pixel size	1.4um	
H_pixel x V_pixel	2592x1944	
Focal length (f)	8mm	25mm
Altitude of satellite	450 km	
Resolution	81.58m	25.29m
H_coverage x V_coverage	211.46 x 156.12km	65.55 x 49.09km

f = 8mm
H_coverage x V_coverage = 211.46 x 156.12km
R = 81.58m

f = 25mm
H_coverage x V_coverage = 65.55 x 49.09km
R = 25.29m

GPS Mission

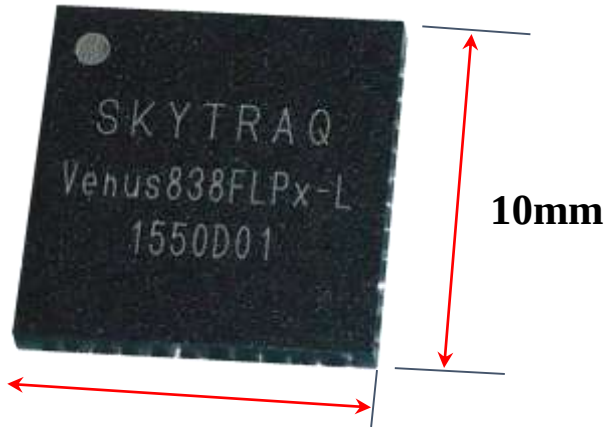
- Mission Objective is to use the GPS COTS for technology demonstration for BIRDS-2 cubesat.

- The Success of proven GPS chip for space application which is low power, cheap, small, COTS and reliable will benefit by future cube satellite development.

- It will set up in such a way the GPS satellite and BIRDS-2 cubesat should lock of at least 4 satellites to calculate position & clock deviation.

GPS subject for on Orbit Mission

Venus838FLPx-L



Technical Specifications

- Price = $99.00
- Size = 10mm x 10mm x 1.3mm
- Weight = 0.3 g
- Tracking = 16mA (52.8mW)
- Acquisition (4 satellites) = 23mA (75.9mW)
- Main Supply voltage = 3.3 V
- Interface: UART TTL
- Data message format NMEA
- Baud rate = 9600 (default)
- Operating Temperature -40 C to 80 C
- **Can withstand radiation level within of 35-50 krad TID**
- **Doppler shift of satellite mobility = Can Lock Signal @ 7km/sec**

Anisotropic Magneto Resistance Magnetometer

- To conduct measurement of magnetic field in space.
- To provide an alternative method of magnetic field measurement in space which work as a support data for geomagnetic mapping of South Asian region.
- To store and send the magnetic field data downlink to be compared with the existing geomagnetic field data.

Anisotropic Magneto Resistance Magnetometer

Measurement Mission Requirements	Margin
Ensure that Sensor can perform **high accuracy** in strong magnetic field environment.	1˚- 2˚ accuracy
Ensure that AMR-MM can perform **high sensitivity** for magnetic field measurement.	230 – 1370 LSb/gauss
Ensure that AMR-MM can perform in **excellent linearity** over a wide dynamic range during magnetic field measurement.	100 pT - 50,000 nT
And most importantly to download this data from Satellite constellation back to Earth's Ground Station	

END OF MATERIAL BY JOVEN

08. BIRDS-2 press conference: Lunch before the press conference

Prof. Cho

Prof. Joel

Dr. Masui

Venue: 2F Control Room of SVBL
Date: Monday, 26 Feb. 2018

Food catered by
the Café of Kyutech

Cont'd next page

Goto-san Azami Adrian

The UiTM Team

Prof. Kamal and Prof. Cho

The UPD Team

09. BIRDS-2 press conference: The main event Monday, 26 Feb 2018

President Oie

Prof Cho

Prof Kamal, deputy VC, UiTM

Prof Marciano, UPD

Joven
BIRDS-2 Project Manager

Abhas of BIRDS-3 in action

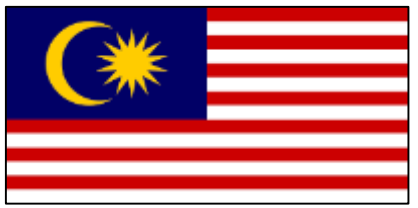
The Skype connection to Bhutan

BIRDS-2 “FM Completion”
Press Conference of 26 February 2018 at Kyutech

Stakeholders, Kyutech staff, project students

Students only



Speeches and Presentations

CALLING IN FROM **BHUTAN** VIA SKYPE

Dasho Karma W. Penjor, Secretary, Ministry of Information and Communications, Bhutan

GOV.BT

Many TV stations sent film crews

Many newspapers sent reporters

End of article on the main event of the press conference

10. BIRDS-2 press conference: Tour of the clean room with the BIRDS-2 flight models

After the main event of the press conference, we moved to the **BIRDS-2 Clean Room** where we explained more (with TV cameras rolling) about the BIRDS-2 Project using its three flight models of Bhutan, Malaysia, and the Philippines.

Three flight models – will go to JAXA for a ride into space

The satellite builders pose with their creations

Outside the clean room (3rd floor)

End of article about FM tour

2018.2.27

九工大留学生が超小型衛星

九州工業大（北九州市）は26日、ブータンやフィリピン、マレーシアの留学生が製作してきた超小型人工衛星3基を報道陣に公開した。早ければ6月にも打ち上げられ、国際宇宙ステーション（ISS）の日本の実験棟「きぼう」から宇宙空間へ放出される。

発展途上国の人工衛星の製作や関連する人材の育成を支援する九工大の「Birds（バーズ）衛星計画」の一環。約10㌢四方の超小型衛星にはカメラや全地球測位システム（GPS）が搭載されており、衛星写真などを留学生の出身国に送信する。

人工衛星3基はそれぞれ、留学生8人が中心となって製作し、日本人学生3人も支援した。宇宙航空研究開発機構（JAXA）に引き渡された後、ISSへの物資と一緒に打ち上げる予定という。

ブータンからの留学生、イーシェ・チョウデンさん（24）は「ブータンにとって初めての人工衛星になる。宇宙空間で無事に機能させることが新たな目標です」と話している。

留学生が製作した超小型人工衛星

10㌢四方 6月にも宇宙へ

International students at Kyutech create CubeSats

This newspaper article is one output of the BIRDS-2 press conference of 26 February 2018.

讀賣新聞
THE YOMIURI SHIMBUN

12. ISEF underway in Japan

01 March 2018 讀賣新聞 THE YOMIURI SHIMBUN

2018年(平成30年)3月1日(木曜日)

宇宙探査に国際ルール

環境保護やデータ公開

月や火星などの天体の保護や科学データの無料公開を柱とする、宇宙探査に関する新しい国際指針の全容が28日明らかになった。3月3日に東京都内で開かれる宇宙関係の閣僚級会合「国際宇宙探査フォーラム（ISEF）」で合意する。

月や火星の探査を巡る各国の動きを踏まえたもので、民間企業との協力も盛り込む。指針は1967年に発効した宇宙条約以来、半世紀ぶりに作られる国際的な基本ルールとなる。

フォーラムの開催は2014年の米ワシントンに続き2回目。今回は日米欧、ロシアや中国など約50か国・地域の閣僚や宇宙機関のトップらが参加し、探査の際に守るべき指針「国際宇宙探査の原則」と、探査の目標などを示す「共同声明」を取りまとめる。

読売新聞が入手した文案によると、指針では、無秩序な資源開発などを避けるため、「宇宙空間と天体の保護」を明記する。探査で得られる新たな発見や観測データは、産業の発展にもつながることから、データの無料公開と各国での共有を求めている。

また、民間での宇宙産業への関心の高まりを受け、探査の成果を生かした「新たな市場やサービスの創出」を進め、経済発展に貢献するとの方針も盛り込む。

月を巡っては、米国による月上空への基地建設の構想がある。中国やインドも本格探査に乗り出し、民間では月面で水などの資源探査の計画が進む。

火星や小惑星についても、日米欧などが無人探査機を送り込んでいる。指針は、こうした探査において、一定の秩序を求める。

国際指針の主なポイント

▽宇宙環境を維持するため、宇宙空間と天体を保護
▽探査で得られた科学データを無料で公開、共有することを促進
▽新たな市場、商業サービスを創造し、経済を拡大

宇宙条約　月などの天体を含む宇宙空間の探査・利用の原則を定めた条約。国連総会で1966年に採択され、翌年に発効した。宇宙空間の探査や利用の自由を認めるとともに、国家による領有の禁止、天体の利用は平和目的とすることなどが明記されている。

Making international rules for space exploration

A number of rules are on the table. For example, one rule being proposed is “any scientific data acquired in space must be provided to all researchers free of charge.”

[I can think of reasons why this could be a bad idea – Editor.]

ISEF (International Space Exploration Forum) was covered on pages 7 and 8 of Issue No. 23 of the BIRDS Project Newsletter.

一方、共同声明では、日米露と欧州が中心となり運用している国際宇宙ステーション（ISS）の次の段階として、月や火星、さらに遠い天体の探査を共通目標として掲げる。

新興国の台頭で利害衝突を懸念

宇宙環境の維持などをうたう探査の指針を、国際宇宙探査フォーラム（ISEF）でまとめる背景には、中国やインドなどの新興国や、民間企業の探査が活発化している現状がある。

冷戦時代の米ソに象徴される、国家間の競争の場だった宇宙開発は現在、産業振興などで実利が見込める段階にある。ただ、参加者の増加につれて利害がぶつかる恐れが高まり、新たなルールを作る必要が出てきた。

指針は文部科学省が中心となり、各国と調整を進めて作成した。拘束力はないが、政府関係者は「守らねば国際社会の信用を失う。今後の議論の出発点となる『東京原則』だ」と話す。

月の資源探査などが今後具体化した場合、詳細な国際ルールや法整備が不可欠だ。宇宙産業の健全な発展に直結するだけに、日本政府にはその後も積極的な関与が求められる。

（科学部　船越翔）

THE 2ND INTERNATIONAL SPACE EXPLORATION FORUM

Cont’d at the other star

13. BIRDS-2 “Fit check”

“Fit check” means to confirm that the CubeSat fits properly into the deployer pod provided by JAXA for satellite deployment from the ISS.

The photo at the right was taken at Kyutech on 7 Feb. 2018. Engineer Akagi of JAXA was present – he is the only person wearing a neck tie in this photo.

©JAXA

The photo above is from last year, for the case of BIRDS-1. You can see the two deployer pods. If the satellites do not fit in their pod, it can spoil your day.

14. Masui sensei discusses for 40 minutes the satellites of LaSEINE – including BIRDS

2018年 宇宙環境技術交流会 (translated below)
日時：2018年3月3日（土）13:00～17:15
場所：（一社）九州経済連合会『大会議室』

開会の挨拶（花田先生）：	13:00～13:05
九州大学吉川先生：	13:05～13:50（45分）
九州大学花田研究室：	13:50～14:30（40分）
休憩：14:30～14:40	
九州工業大学奥山研究室：	14:40～15:20（40分）
九州工業大学趙研究室：	15:20～16:00（40分）, Dr Masui
休憩：16:00～16:10	
QPS研究所：	16:10～16:50（40分） 大西社長
キヤノン電子：	16:50～17:10（20分）） 早川さん
閉会の挨拶（趙先生）：	17:10～17:15

The title of this event when translated word for word is **"Space Environment Technology Symposium".** It is held annually and it alternates between Fukuoka and Kitakyushu. Last year Kyutech was the host, and next year it will be the host.

Last year, BIRDS-1 Student Nakamura gave a presentation on **BIRDS-1** for this symposium -- see page 11 of BIRDS Project Newsletter No. 14.

BIRDS

3 March 2018 in Fukuoka City

Prof. Cho closed the event.

Good turn out of academia and industry.

15. Ghana and Kyutech mentioned in “Via Satellite”

Via Satellite

This is an excerpt from “Via Satellite” online web magazine of 5 Dec. 2017. The web link for it is shown below.

All Nations University College students Benjamin Bonsu, Joseph Quansah and Ernest Teye Matey, who developed Ghana's first satellite. Photo: All Nations University College.

Innovation

Six New Entrants to the Satellite Industry in 2017

By Kendall Russell | December 5, 2017

Ghana

Japan and Ghana formed an unlikely partnership this year to help orbit the African nation’s first ever satellite, an optical remote sensing CubeSat called GhanaSat 1. It took a team of three students from **All Nations University**, two years, and $500,000 to develop the satellite, as part of the **Kyushu Institute of Technology’s** Joint Global Multi-Nation Birds Satellite project.

Because the Ghanaian government provided no official support for the project, the **Japan Aerospace Exploration Agency** (JAXA) contributed most of the training and funds the team needed to get the satellite into orbit. While the Ghanaian president did congratulate the team on their successful launch, the government’s reluctance to invest in space reflects an attitude present in other African countries as well, which have been hesitant to establish a broader African Space Agency.

www.satellitetoday.com/innovation/2017/12/05/six-new-entrants-satellite-industry-2017/

16. Individual reports of “First Ground Station Operation Workshop”

In this section we present the individual reports written by the participants of the **First Ground Station Operation Workshop** of January 2018.

For a full report of this workshop, see pages 44-63 of **Issue No. 25** of this newsletter.

The travel costs of these participants were underwritten by **JSPS**.

Participants of the First Ground Station Operation Workshop
(JANUARY 2018)

Report No.	Country	Title	Name	Affiliation	Category	Report Status
1	Sudan	Mr.	Yasir Ahmed Idris HUMAD	Institute of Space Research and Aerospace	Potential BIRDS-4	Submitted
2	Thailand	Mr.	Vasan PANTARACHOTE	King Mongkut’s University of Technology North Bangkok (KMUTNB)	BIRDS-1	Submitted
3	Philippines	Ms.	Mary Ann ZABANAL	University of the Philippines Diliman	BIRDS-2	Submitted
4	Mongolia	Mr.	Altansukh MAINBAYAR	National University of Mongolia (NUM)	BIRDS-1	Submitted
5	Malaysia	Ms.	Siti Nadhirah BINTI MOHAMAD RAHIM	Universiti Teknologi MARA (UiTM)	BIRDS-2	Submitted
6	Nigeria	Mr.	Olaide Ayodeji AGBOLADE	The Federal University of Technology Akure (FUTA)	BIRDS-1	Submitted
7	Bangladeah	Mr.	Md Mojammel HAQUE	BRAC University	BIRDS-1	Submitted
8	Taiwan	Ms.	HUNG, YA-TZU	National Cheng Kung University (NCKU)	BIRDS-1	Submitted
9	Costa Rica	Mr.	Esteban MARTINEZ VALVERDE	Tecnológico de Costa Rica (TEC)	Central America	Submitted
10	Ghana	Mr.	Matey, Ernest Teye	All Nation University College (ANUC)	BIRDS-1	Submitted
11	Ethiopia	Dr.	Tsegaye Kassa GOGIE	Bahir Dar University	Potential BIRDS-4	Submitted
12	Bhutan	Ms.	Karma Yuden DORJEE	Department of Information Technology and Telecom (DITT), Ministry of Information and Communications	BIRDS-2	Submitted
13	Malaysia	Ms.	Afifa binti Taat	Universiti Teknologi MARA (UiTM)	BIRDS-2	Submitted

Report No. 01

First Ground Station Operation Workshop Report

By
Yasir Ahmed Idris Humad
Head of communication systems Department

Feb 2018

Upon the moment of arrival to Japan, I was really impressed by the wonderful and well-organized environment and people in Japan in general and in Kyushu and Kyutech in particular. I was excited by the noticeable care and high quality in all services I encountered.

During the workshop, I evidently noted how laboratories of Kyutech are well arranged, of high technology and up to date. The workshop organizing team were very collaborative and continuously positive. If I have a comment, I would recommend in the next workshop to increase the practical training hours, compared to theoretical and lectures hours.

Knowledge that I gained includes satellites ground stations, detailed description of each part in the station and working principle, integrating ground station subsystems together and monitoring software, using ground station software to transmit and receive data via satellites, besides working in existing BIRDS satellite ground station.

I wish if we learned about the old network, and how data is collected from different stations to have data from all BIRDS satellites. However, it was great working in real satellite laboratories of such high technology.

Benefited from the workshop, we are going to start establishing ISRA ground station, according to the specifications of the BIRDS ground stations network. Participation in the first ground station workshop has enriched me with appropriate experience to achieve this task, deep thanks to Kyutech.

First Ground Station Operation Workshop

Date: 16 February 2018
Name: Vasan Jantarachote, **Nickname:** Eddie
Education level: Doctoral Degree
Program: Electrical and Software Systems Engineering
Department: The Sirindhorn International Thai-German Graduated School of Engineering (TGGS), King Mongkut's University of Technology North Bangkok (KMUTNB)
Address: Bangkok, THAILAND
Email: jantarachote.vasan@gmail.com

Report No. 02

Fig.1 First Ground Station Operation Workshop in Kyushu Institute of Technology, Japan

On 22nd-31st January 2018, the First Ground Station Operation Workshop was held at the Kyushu Institute of Technology, Kitakyushu, Japan. I was one of the young researcher representatives from 12 countries who attended and exchanged experiences for 10 days. The workshop program is well organized. Participants have the opportunity to attend an international conference on Lean Satellite held on 22-24 January 2018, which opens up my mind about research and development of small satellites and are interested in the space industry.

Participants also have the opportunity to listen to their vision and inspiration from the CEOs of leading space companies such as Spire Global, ISIS, GAUSS SRL, NSLComm, etc. Subsequently, during 25 -31 January 2018 Ground Station Operation Workshop was started. The goal of this training is to focus on practical applications or learn by doing such as assembling the device and receiving the satellite signal by using ground station manually.

The training also includes a section that allows participants in each country to share their experience about the ground station, local applications, as well as those related to space, satellite and national laws. This is a great benefit for participants who will be able to bring their knowledge and experience from the workshop to develop or forward this experience to people in each country. This will create a network that will be the power to develop the ground station network and cooperation to build a small satellite together in the future.

By participating in the GS workshop, I plan to bring this knowledge and experience to people in my country, starting with the third and fourth-year students of the Faculty of Engineering with interest in aerospace, by teaching them to receive the satellite signals using our ground station system. This training will help to understand the basics of the ground station and small satellite, which will increase the number of people with knowledge of space and also increase the number of the KNACKSAT satellite group members. These students will be the next major force in operating GS and developing smaller satellites in the future. For the next plan, KNACKSAT will continue to build S-band ground station and S-band communication board for small satellite.

Finally, I would like to thank the sponsors and organizers of the GS workshop, as well as those who represent of the 12 countries that provide opportunities, knowledge, experiences, and inspiration to each other. Hopefully, this training will be a good start to building a major network of ground stations and exchanging more space technologies for sustainable development.

Fig.2

KNACKSAT Ground Station Operation Workshop in King Mongkut's University of Technology North Bangkok (KMUTNB), Thailand, 8-9 February 2018.

Fig.3

KNACKSAT Ground Station Operation Workshop Participants, KMUTNB Thailand, 8-9 February 2018.

Report No. 03

Date of Report: February 14, 2018

Full Name: Mary Ann Zabanal

Nickname: Me-ann

Institute: PHL-Microsat (University of the Philippines Diliman)

Country: Philippines

I was blessed to be selected as my team's representative to the First Ground Station Workshop (GSW) jointly held with the 2018 International Workshop on Lean Satellite (IWLS). The GSW was conducted at the very beautiful and clean campus of Kyushu Institute of Technology (Kyutech). The short tour to its facilities showcased Kyutech's capabilities in satellite development, testing and operations. We had a lecture on various concepts related to ground station setup and operations. We were introduced to InfoStellar, and were oriented on how their hardware can be added to our own ground stations. We were also given the opportunity to track and receive data from orbiting satellites. Overall, it is an enriching and unforgettable experience. I was able to meet and exchange ideas with the representatives of other countries.

The IWLS further added value and gave important lessons to the GSW participants. I also love the inclusion of the panel discussions – I received valuable inputs that we can use for the GST development – although it may have been great if the workshop was timed on a less-hectic schedule so that majority of the BIRDS members will be able to attend and participate on the discussions. I will be looking forward to the next GSWs which will hopefully be held on a warmer day (spring?). And if it will be not too much of a stretch, maybe then, the participants can actually setup a ground station and use that same setup for tracking, to maximize the experience and lessons learned.

Photo with InfoStellar and GSW participants.

“First Ground Station Operation Workshop-2018” report

Report No. 04

Ulaanbaatar, Mongolia -- 21 Feb 2018

My name is ALTANSUKH Mainbayar and short name is Aagi. I work as s researcher in Nano satellite development laboratory of National University of Mongolia.

I participated in ground station technological training from January 22-31, 2018, at the Kyushu Institute of Technology (Kyutech) by Prof.Mengu Cho’s invitation. I'm very happy to been involved international Lean satellites and first ground station operation workshop hosted by Kyutech. Also, thank you to Mr. Apiwat of the BIRDS project team.

The workshop was attended by 12 young people the BIRDS project ground station, satellites, test laboratories, and during the training session, ground station equipment was assembled and tested. AOBA-VELOX3 satellite signal processing was an effective work. It was okay to give more detailed advice on S-band.

It was amazing to attend the International Workshop on Lean Satellite-2018. 10 days-long research visit was greatly efficient that I have known more about the field of space engineering and satellite ground station.

From the first ground station operation workshop I have gained new knowledge and information. My next plan is to maintain reliable operation of satellite ground station established at National University of Mongolia. As a result, we will be able to work on the processing of the BIRDS-1 and BIRDS-2 satellites’ signal.

Date: 02/23/2018

Name: Siti Nadhirah Mohamad Rahim (Nadhirah), Universiti Teknologi MARA (UiTM), Malaysia

Report for First Ground Station Operation Workshop 2018

– Organized by Kyushu Institute of Technology, Japan

Report No. 05

I was introduced to Japanese's context since childhood and gradually, became interested to learn about Japan. Thanks to the First Ground Station Operation Workshop 2018, I felt privileged being able to experience more about Japan. I am also glad to meet many kind people during my visit. I believe, Kyutech, where the workshop was held, is a great university with nice and serene surroundings. The whole workshop schedule was good and the activity at each slot was interesting. I learnt many new things and improved my understanding as my current study is related to the ground system for satellite communication. International Workshop on Lean Satellite 2018 opened many realizations towards space technology and its values.

Additionally, the on-site visit to the Kyutech's ground station (rooftop and control room) and the satellite's development facilities displayed the enthusiasm of the involved students and teachers. Plus, meeting Infostellar's Naomi-san was a pleasant surprise. Lesson learnt from the workshop includes the essence of collaboration for each successful outcome. It is required to bring forward satellite technology at home country because both space and earth are mutually important. Strategies need to be devised in nurturing one-stop center for satellite application where it comprises multidisciplinary fields including engineering, science, business and law for the whole process of satellite development to the submission/transferring valuable data to end user. Before ending, I would like to extend my heartfelt gratitude to the organizer and BIRDS members for organizing the workshop and the time spent for us. Arigatou gozaimasu!

Report No. 06

Nigeria
Mr. Olaide Ayodeji AGBOLADE
The Federal University of Technology Akure (FUTA)

The first ground station workshop in Japan was something I looked up to with great expectation. A visit to Japan has always been my dream and on arrival, I was not disappointed. The energy of the country and the industry of its people are astonishing. The culture is great, the environment clean and the food perfect. Kyutech was another place I found exciting. The students were nice and the environment was very welcoming.

The international workshop on lean satellite and the ground station workshop were of immense benefit to me. I learnt in ten days what I possibly couldn't learn in ten weeks of self-study. I also learnt so much from my colleagues who came from other parts of the world. I learnt even more from all the facilitators that came for the different training sessions of the workshop. Within those ten days of training, I was able to identify several research interests and I also obtained a very clear direction for my PhD work.

From my observation of Kyutech research philosophy, I was able to put up some recommendations which I'm sure will help both my Department and my University's space programme. Cold was one thing we all struggled with. Maybe summer time would have been more welcoming for participants from tropical countries.

It was a great honour and privilege to be a part of the workshop and I'm grateful to all who made it happen.

Report on “First Ground Station Operation Workshop”

Report No. 07

Date: 23rd February, 2018
Name: MD Mojammel Haque (Shourobh)
Affiliation: Satellite Operation Engineer, NASTER, BRAC University
Country: BANGLADESH

The Ground station workshop held at Kyutech Institute of Technology was the first workshop with the ground station operators of “BIRDS” affiliated countries which was another milestone for the “BIRDS” project regarding international togetherness and collaboration.

The whole workshop was well organized and the instructors, senior “BIRDS” members and students of Kyutech was very helpful regarding workshop as well as how to live in Japan. The workshop covered the whole ground station setup, calibration and operation practically which was great as it helped us gather the knowledge of everything which is working collectively for satellite communication. From my point of view, there might be some holidays for sight-seeing for understanding more about Japanese culture and spending time with each other. More in depth “Fault Tree” analysis of previous projects can be added to next workshop as it can help to improve the next project. Practical sessions should be kept.

The most surprising things for me were the generosity of people of japan, the way they treat others and the way they follow rules. We can learn from Japanese how to follow rules without enforcing them and this is going to help me throughout my life.

First Ground Station Operation Workshop Report

Report No. 08

Date : 21 Feb. 2018
Namw: Ya-Tzu Hung (Everyday name : Rita)
Institute: Department of Electrical Engineering, National Cheng Kung University
Country: Taiwan

During the time we spent in the workshop, the weather was really cold in Japan. But it's very neat and beautiful. With the snow and expectancy in the beginning, we get lots of information from many international lean sat experts in IWLS.

After the conference, the courses were held in Kyutech. Courses start from the inspiring speech by Prof. Jordi. Doing hands-on installation and sharing the idea with each other help me to understand the things I lack of and further help me to improve our own ground station operation. Also, it gives us the opportunity to have a discussion with speakers which benefits a lot to me. On the other hand, the compact classes also show many things that we should know which makes me need to really focus on these working days.

Among these courses, the function and application of S & F on various national issues impressed me the most. It shows the possibility of using limited resource and how excited to use microsatellites to solve problems in each country. What I gain most in the workshop is to see the difference between people, countries, and the problem we encounter by different point of view. Through sharing and discussing, it makes members reflect on our own country and understand that it can make a difference.

I really appreciate to attend this workshop. Hope through the thinking of problem and the practical application we learn will be helpful to the future of the country and society.

First Ground Station Operation Workshop

Report No. 09

Date of Report: 23nd February, 2018
Name: Esteban Martínez Valverde
Affiliation: Costa Rica Institute of Technology
Country: Costa Rica

The workshop was very successful. Starting from the great hospitality of the Kyutech Staff to the cultural and technical knowledge exchange. Although Japan is a big country and the language barriers are considerable, the guides to arrive at the hotel and at Kyutech were very detailed and helpful. Thanks to the good train service we were able to visit several places around Kitakyushu. The food was exquisite in all aspects, and I really enjoy sharing all the tastes with the members of the workshop.

Attending to **International Workshop of Lean Satellite** (IWLS), before the ground station workshop, helped to make a complete introduction in the lean satellite concept and the works that are being developed around the world. I understand in this occasion this was possible because both activities were in Japan, if this is not the case, may be in the future you should make a summary of the IWLS in the ground station workshop.

In the photos you can see that we shared a lot of time together, both in and out the workshop. This helped us to get to know each other better and improve trust and interpersonal relationships. A participant had the idea to create a Facebook Chat, with purpose that we can communicate between each other (in case somebody get lost, sharing photos or for technical questions). Creating a chat (not necessary Facebook Chat), might be a good idea to be mandatory for futures workshops.

Some of the workshop participants had no experience in the satellite tracking operation and the instructors teach us everything from the beginning and it really was good. But for other experienced people they had to listen some basics that they already know. Before the workshop, it would be good to make a brief inquiry to the participants, so they can be organized in groups, according to their knowledge and skill levels.

What really surprise me about the workshop was two things mainly:

1. *the operation with real satellites (even with satellites in ground), and*
2. *the rich cultural exchange with the other participants.*

Now, back to my country and with all the knowledge that I acquired in workshop, I'm planning to train Costa Rican operators, that be able to listen BIRDS-II, Irazú and others CubeSats. Also, we are looking forward to do a CanSat Competition and use the ground stations for monitoring the beaconing of the CanSats.

FIRST GROUND STATION OPERATION WORKSHOP REPORT

Name :	**Ernest Teye Matey**
Nationality :	Ghana
Host :	Laboratory for Spacecraft Environment Interaction Engineering, Kyushu Institute of Technology, Japan.
Dates:	22nd January to 31st January (10 days)

Report No. 10

Summary

The first Ground Station workshop was successful and very educative. The first 3 days were for the International Lean Satellite Workshop and also a facility tour at kyutech. The 4th day began with a well informing lecture from Prof Jordi Puig-Suari on the topic: CubeSats as workforce development. The day continued with lectures on Ground Station network operation from the Infostellar team. The 5th day had tutorials on local Ground Station equipment installation conducted by kyutech students. On the 6th and 7th day, each participant witnessed and was made to participate in on-orbit operation of satellites to receive signals. Each participant was given chance to present about their satellite businesses in their home countries and institutions. On the 8th and 9th day were tutorial from BIRDS-2 members particularly on their mission with Store and Forward and its Ground Systems operation. Beginning the last day was a tutorial on the APRS mission operation from the BIRDS-2 team. The workshop ended with a general meeting with all BIRDS member based on BIRDS-1 design, functionality and operations.

Appreciation

I wish to appreciate Prof. Mengu Cho for inviting me to the workshop and also for JICA for sponsoring my expenses (hotel, food, ticket) concerning this workshop. The workshop was very educative, practical and generally beneficial.

Personal Comment

I have personally gained a lot from this workshop and also having to get more experience on working together with people from difference countries (Sudan, Nigeria, Ethiopia, Philippines, Bhutan, Malaysia, Thailand, Taiwan, Bangladesh and Mongolia). I hope this ground station workshop continues on annual basis.

Pictures

Report on the first ground station operation workshop

Report No. 11

Date of Report: 23rd February, 2018
Name: Tsegaye Kassa Gogie (PhD)
Affiliation: Washera Geospcace and Radar Science Research Laboratory, Department of Physics
Country: Ethiopia

The “**First Ground Station Operation Workshop”** for the BIRDS project was held at the Kyushu Institute of Technology (KyuTech), Fukuoka, Japan from 25th January to 31st January, 2018, after successful completion of the International Workshop on Lean Satellite, 2018 held at the Kitakyushu International Conference Center, Fukuoka from 22nd January to 24th January, 2018. The International Workshop on Lean Satellite has discussed various aspects and issues related to lean satellites.

The Ground Station Operation Workshop comprised of presentations/discussions related to the BIRDS projects and its missions, demonstration of ground station operation, and hands-on practice on installation and setup of the ground station.
For new comers like me, the workshop was the best practice to go ahead in satellite technology.
Different experts from different countries were gathered to share their experience in Cub satellite designing and lunching. That was really great experience for Ethiopians.

Specifically, the hands-on practice sessions on the installation, setup and operation of the ground stations was eye catching for the beginners and we have learnt so many things related to satellite operation. The experience gained from these sessions will be very useful particularly during the installation and operation of our own ground station after the success of BIRDs 4.

Finally, I would like to say that the workshop was fantastic and perfect place for learning satellite related technologies. I personally was delighted with the hospitality of Japanese and their varieties of food items that I tested.

First Ground Station Operation Workshop

Report No. 12

Date of Report: 22nd February, 2018
Name: Karma Yuden Dorjee
Affiliation: Department of Information Technology and Telecom, Ministry of Information and Communications
Country: Bhutan

The "**First Ground Station Operation Workshop"** for the BIRDS project was organized by and held at the Kyushu Institute of Technology (KyuTech), Fukuoka, Japan from 25th January to 31st January, 2018, following the International Workshop on Lean Satellite, 2018 held at the Kitakyushu International Conference Center, Fukuoka from 22nd January to 24th January, 2018.

The International Workshop on Lean Satellite, which has been held every year since 2011, discussed various aspects and issues related to lean satellites. The Ground Station Operation Workshop comprised of presentations/discussions related to the BIRDS projects and its missions, demonstration of ground station operation, and hands-on practice on installation and setup of the ground station.

For a beginner in space and satellite, the workshop was a very good platform to acquire information and enhance knowledge in space and space related activities, interact with various universities and explore opportunities in space.

The best part of the workshop was the hands-on practice sessions on the installation, setup and operation of the ground station. The experience gained from these sessions will be very useful particularly during the installation and operation of our own ground station.

Overall, the workshop was a great learning experience amidst the very unpredictable and delightful weather of Fukuoka, Japan. Thank you Kyutech for the opportunity and organizing the workshop.

THE FIRST BIRDS GROUND STATION OPERATION WORKSHOP AT KYUSHU INSTITUTE OF TECHNOLOGY

Report No. 13

This is the last one.

Afifah Taat
Center for Satellite Communication
Faculty of Electrical Engineering
Universiti Teknologi MARA (UiTM),
Shah Alam, Malaysia.

23rd February 2018

Kyushu Institute of Technology knows as Kyutech is one of the strongest institutions in Japan that have very good international collaboration. The impressive with this institute while the English language is becoming the main language for each student instead of Japanese language. The first ground station workshop (22nd -31st January 2018) at Kyutech shows the capability of this institute to spread the knowledge and technical skills to people, besides supporting the BIRDS project. A good point of this workshop is collaboration. This international collaboration and networking is a future advantage for all participants. On the other hand, working with people who think differently and might be even hard to collaborate with, forms a creative disruption.

The local ground station installation training that was given to participants helps them to install the ground station at their own countries. On the other hand, as for improvement, in addition to the lecture-type presentation, it is more interesting to have technical hands-on activities. After completing this workshop, UiTM next step is to appoint a full-time ground station operator and to give hands-on trainings to other universities in Malaysia as our support and contribution to our country.

Figure 1.
Group photo taken during local ground station installation training.

Final note about the **First Ground Station Operation Workshop**

On behalf of all the students and staff of Kyutech, we the undersigned would like to thank the workshop participants for sending in their reports – they are all highly informative and will be studied when the **Second Ground Station Operation Workshop** is organized one year from now.

We hope the participants will share their experiences and knowledge with their colleagues back at home so that each ground station is a sustainable for the long-term. People come and go. But we need the ground stations *not to do that*. To support constellations of satellites in the future, we also need a constellation of well-functioning ground stations. For this reason, this workshop was organized.

Faithfully yours,
G. Maeda, BIRDS Research Coordinator
Apiwat, BIRDS Ground Station Coordinator

17. Would you like to study space engineering at Kyutech?

If you would like to study at SEIC (Space Engineering International Course) of Kyutech, you must apply for admissions. To enroll for Fall of 2018 classes, you must submit all application documents before the end of April 2018.

You may pursue a Masters Degree (2 years) or Phd (3 years).
The requirements are straightforward:

- Passion about space
- Bachelor's degree in some field of engineering
- Very high GPA for that degree
- English fluency
- Willingness to experience the culture of Japan, and learn a bit of its language

If you are interested contact:

George Maeda maeda@ise.kyutech.ac.jp
and
Megumi Kennedy kennedy-m@jimu.kyutech.ac.jp

18. MAYA-1 (BIRDS-2 of the Philippines) mentioned by newspaper

Pinoy-built cubesat ready for launch in June

Maya-1, the first cubesatellite or cubesat built by Filipino engineers from the Department of Science and Technology (DOST), is ready for deployment and launch into orbit.

Joel Joseph Marciano Jr., acting director of the DOST's Advanced Science and Technology Institute (ASTI), said the flight model was set for turnover to the Japan Aerospace Exploration Agency (JAXA) on April 1.

JAXA will arrange for its transport to the International Space Station (ISS), from where it will be launched into orbit sometime in June.

"As you can see, it is ready. We're just waiting for procedural matters," Marciano said in a video press conference at the Kyushu Institute of Technology campus in Fukuoka prefecture in Japan last Monday.

Two of the DOST engineers who built Maya-1 under the guidance and supervision of the Kyutech, Joven Javier and Adrian Salces, joined Marciano at the video conference along with Kyutech president Yuji Oie.

Javier and Salces were sent by the Philippine Council for Industry, Energy and Emerging Technology Research and Development (PCIEERD) to Japan to participate in the Joint Global Multi-Nation Birds Satellite or Birds-2, a cross-border university project for the development and operation of cubesats.

The first Birds project was successfully implemented by participating countries Ghana, Mongolia, Nigeria and Bangladesh.

Under Birds-2, the Philippines will be joined by Malaysia and Bhutan, with each country building its own one-kilogram cubesat flight model to be launched and operated as a constellation in space. The Birds-2 cubesats are Maya-1 for the Philippines, Bhutan-1 for Butan, and UITMSAT-1 for Malaysia.

Following the turnover to JAXA, Japanese experts will conduct final tests on the cubesats on their spaceworthiness.

The cubesats are then expected to be brought to the ISS in June and released into low orbit by July utilizing the Japanese experimental module Kibo.

Maya-1, despite its miniature size compared to normal satellites, will have multiple missions, the DOST said.

Under the Birds-2 project, Maya-1, Bhutan-1 and UITMSAT-1 are expected to demonstrate the nanosatellite constellation store-and-forward (S&F) system for remote data collection, wherein the three member countries will have access to each other's cubesats through their own ground receiving stations.

The Birds-2 cubesats are also equipped with a camera allowing image capture of one's home country and amateur radio frequency for simple voice communications and sending of short messages.

Using the S&F system, the ASTI said Maya-1 targets to conduct soil moisture analysis of the country's land surfaces for agricultural applications.

"We can do habitat monitoring especially in the most remote areas in our country," Marciano said.

Elaborating on possible uses of Maya-1, Marciano said they could monitor dynamite fishing in far-flung areas of the archipelago through sensors installed in strategic seawaters.

– Rainier Allan Ronda

THE NEWSPAPER

THE PHILIPPINE STAR Business

B6 science&environment

THE DATE

Editor: JUANIYO ARCELLANA

THURSDAY | MARCH 1, 2018

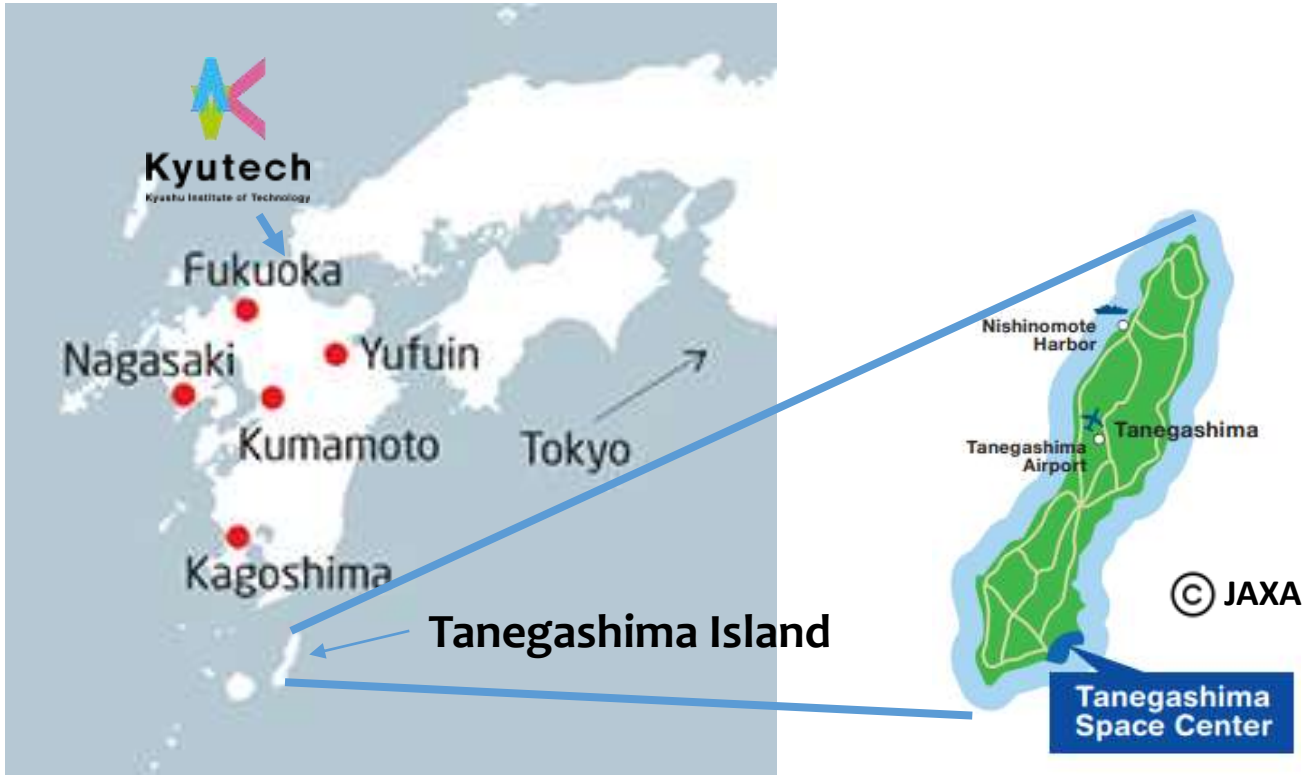
Thanks to:
Paula Jean Cansino, Research Associate
PHL-Microsatellite Program
Electrical and Electronics Engineering Institute (EEEI)
for submitting this article to this newsletter.

19. BIRDS-1 student views the launch of Flight No.38 (H-IIA rocket)

H-IIA Rocket Launch Flight #38 at Tanegashima Space Center

Text by Apiwat Jirawattanaphol

Photos by P. Meemak

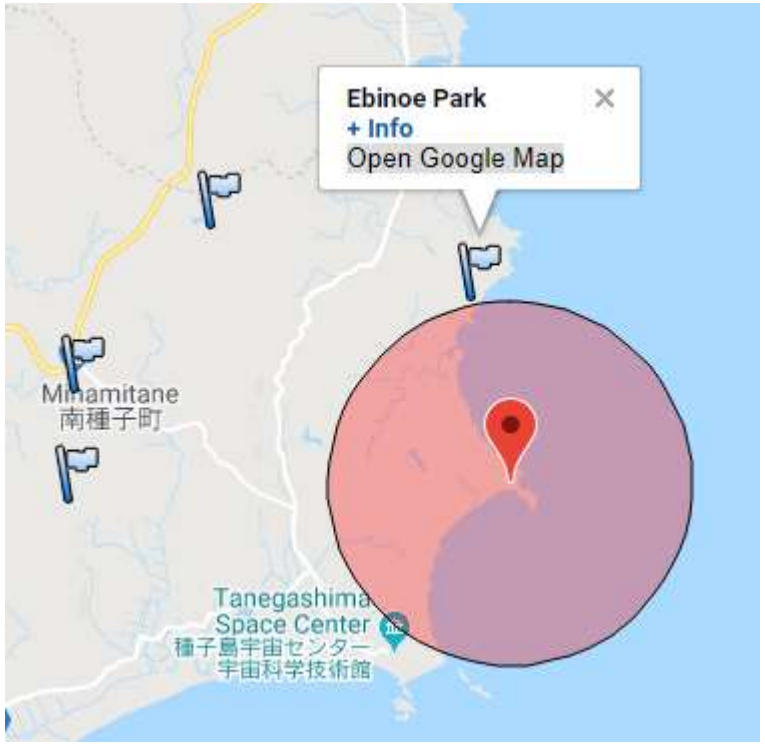


© JAXA

The Tanegashima Space Center (TNSC) is the largest rocket-launch complex in Japan, Located in the south of Kagoshima Prefecture, along the southeast coast of Tanegashima, it is known as the most beautiful rocket-launch complex in the world.

Source: http://global.jaxa.jp/about/centers/tnsc/index.html

Launching Observation Point



All area with in 3 km radius (red circle) from the launch pad is off-limits on the launch day.

Apiwat went to observed the H-IIA launch at Ebinoe park, the nearest rocket observation point from launch pad. Ebinoe park is crowded with rocket spotters and many children.

Souvenir shops

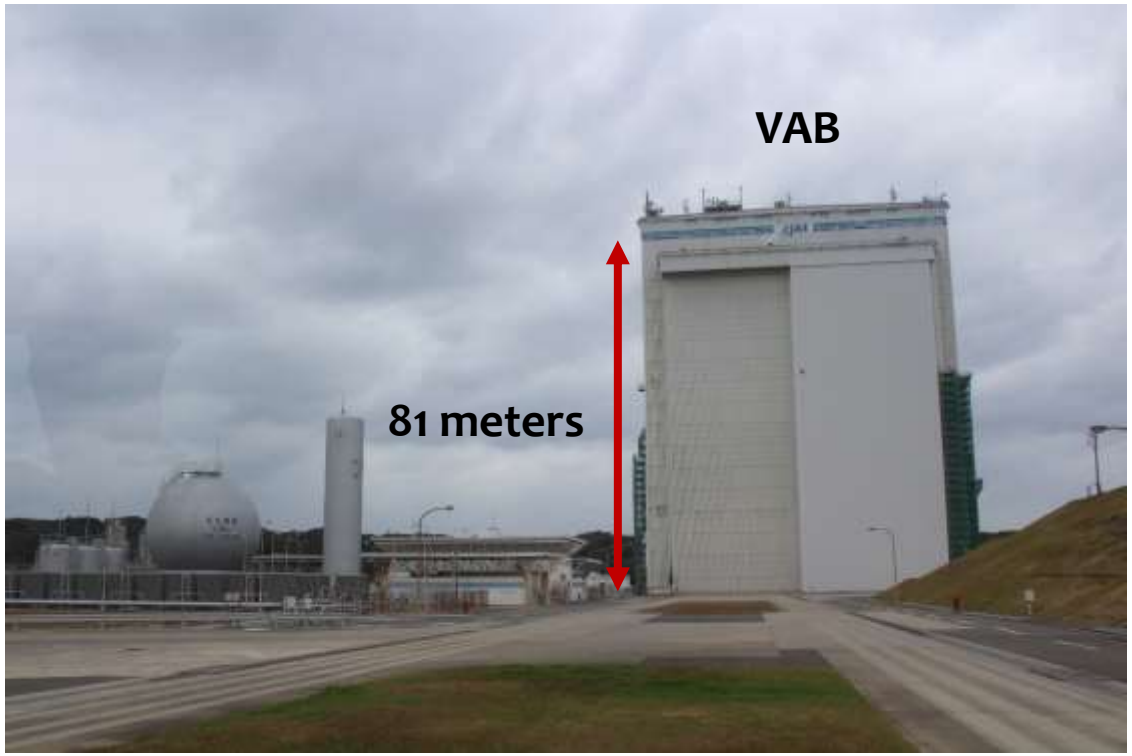
LIFT OFF!!!

Major Specifications of the H-IIA launch vehicle

- Length: 53 m
- Liftoff mass: 289 t (without payload mass)
- Guidance Method: Inertial Guidance Method

An H-IIA rocket carrying a Japanese government intelligence gathering satellite (IGS-6) was launched on February 27th from Tanegashima Space Center. It was launched by The Japan Aerospace Exploration Agency (JAXA) and Mitsubishi Heavy Industries

Tanegashima Space Center Facilities Tour



H-IIA Launch Vehicles are launched from Launch Pad 1.
H-IIB Launch Vehicles from Launch Pad 2.
KOUNOTORI (HTV) cargo transporter that carries food, clothes and experiment device to ISS also launch here.
BIRDS Satellites may have opportunity to launch from Tanegashima in the future.

Vehicle Assembly Building (VAB) is a facility to assemble, outfitting, and inspect a launch vehicle shipped from a factory. At the VAB, two vehicles can be assembled simultaneously. The launch vehicles are assembled on a large-scale launch vehicle movable launcher (ML). The satellite and fairing are mounted, and the vehicle is transported to the launch pad.
Source: http://global.jaxa.jp/activity/pr/brochure/files/centers02_e.pdf

End of report by Apiwat

20. Bangladesh BIRDS-1 team is recognized by ACI Group

Congratulations to Maisun, Antara, and Kafi, for receiving a special award from **ACI Limited** in Bangladesh. This award is given to exceptionally talented young minds of their generation who have made their mark in their respective fields and have contributed to society and to the country's economy. There was celebratory event called "দুঃসাহসীবাংলাদেশ" ("Dussahoshi Bangladesh" which means "Daring Bangladesh"). It was held on 3rd March, 2018, at the Radisson Blu Dhaka Water Garden. The Honorable Finance Minister Abul Maal Abdul Muhith presented a crest to Kafi and Antara as a token of appreciation.

The Daily Shamakal, 4 March 2018

ACI GROUP : Seated from right, M Anis Ud Dowla, chairman of ACI Group; AMA Muhith, finance minister; Tapan Chowdhury, managing director of Square Pharmaceuticals Ltd; Barrister Rafiqul Haqaue, noted jurist; Kazi M Aminul Islam, executive chairman of Bangladesh Investment Development Authority; Latifur Rahman, chairman and CEO of Transcom Group; Syed Manzur Elahi, chairman of Apex Group, and Prof Jamilur Reza Choudhury, vice chancellor of University of Asia Pacific, pose at an event to celebrate the 25 anniversary of local business conglomerate ACI Group, in the capital's Radisson hotel on Saturday.

Flight Model End-to-End Test

Report prepared by:

Adrian C. Salces

(BIRDS-2 member of the Philippines)

8 March 2018

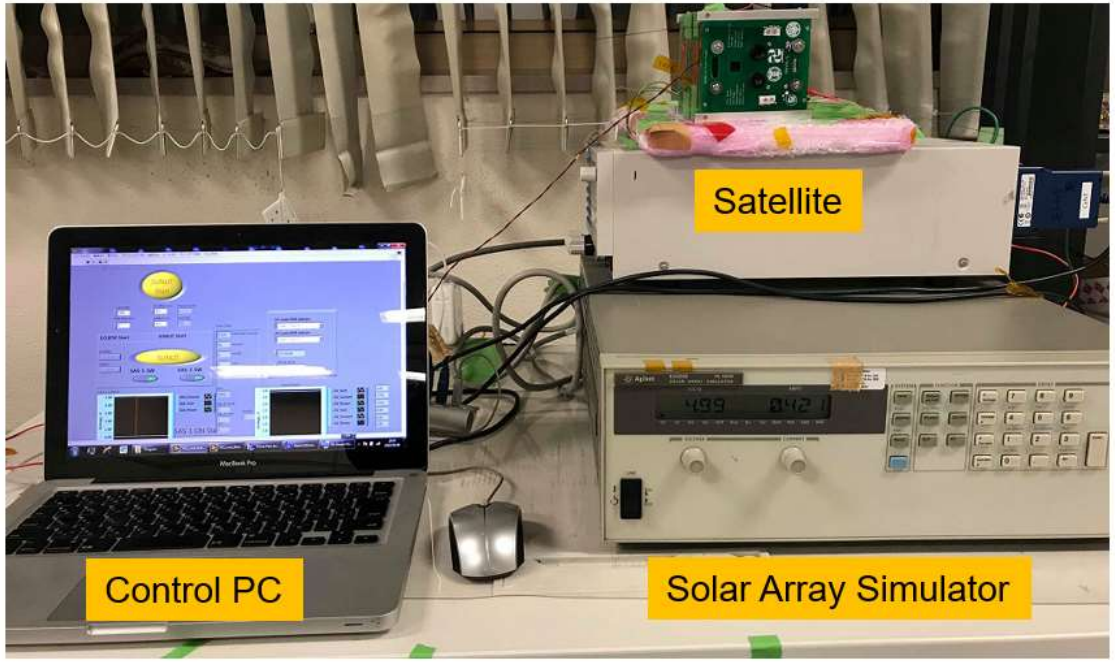
Purpose

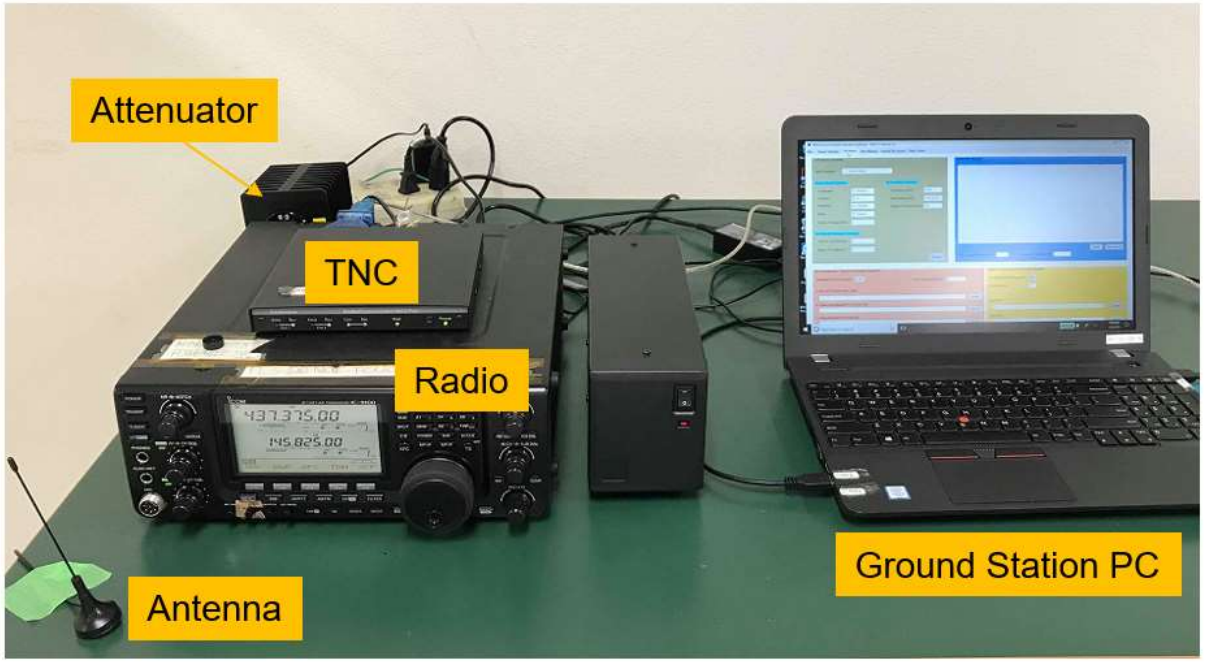
End-to-end test on the BIRDS-2 CubeSat flight models was performed for the following objectives:

- Verify the preparedness of all onboard software for long-time operation.
  - Identify software bugs and after assessment of the risks, address the critical ones.
- Check the operation and response of the satellites to a list of ground station commands after removing all serial monitors.
- Practice operation of the satellites using the BIRDS ground station equipment and software, following a schedule of satellite passes obtained from orbital simulation.
- Simulate the on-orbit sequence the satellites will undergo after release from the ISS and antenna deployment.
- Familiarize the procedure of loading the final flight software before satellite delivery to JAXA.

Step 1: Preliminary functionality and software checks on a spare flight unit.

This test would qualify the readiness of the latest software for loading to the three actual flight models (BHUTAN-1, MAYA-1 and UiTMSAT-1).

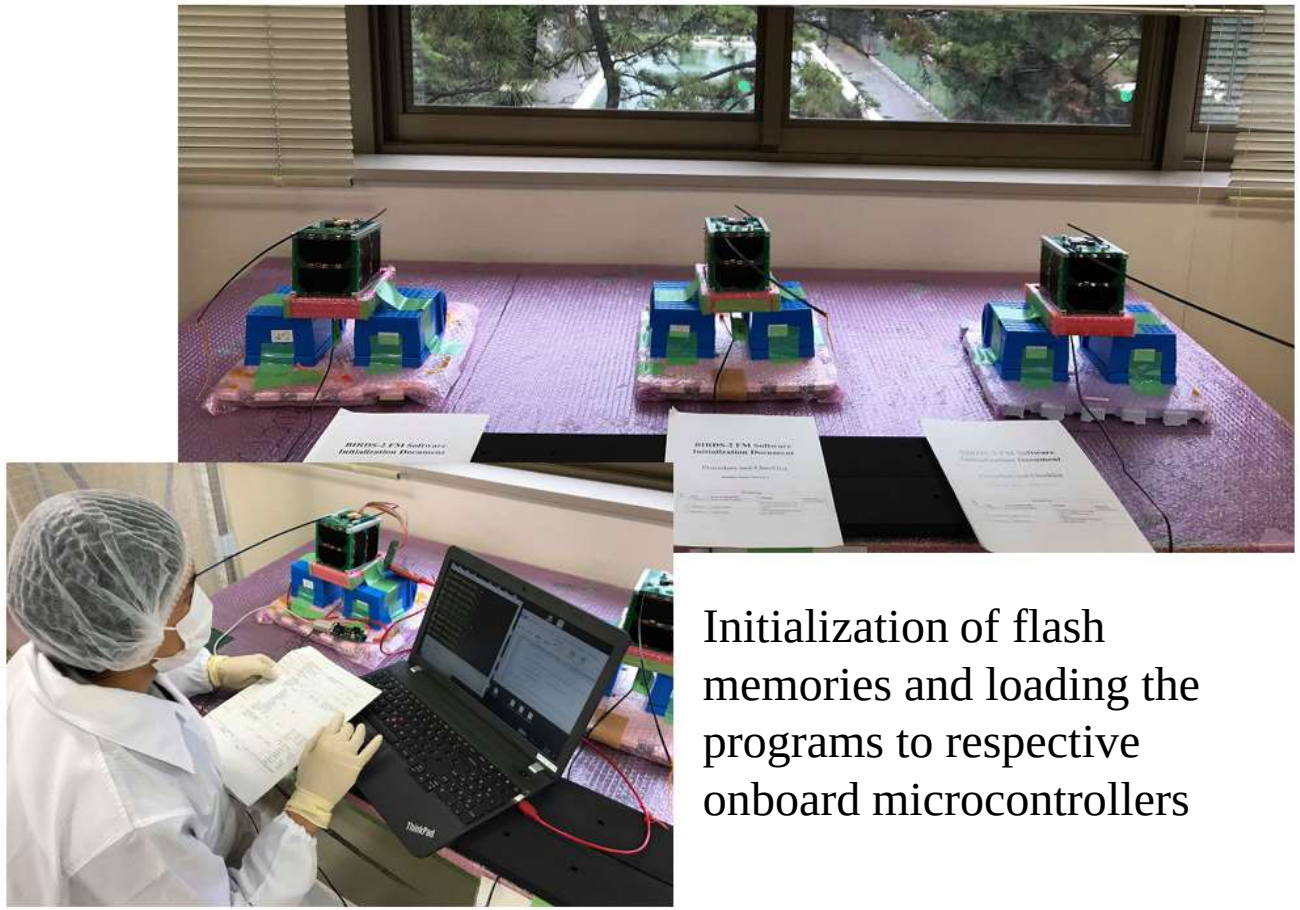




Above left is the preliminary end-to-end test setup. Using a solar array simulator (instead of a typical power supply), we also checked the satellite power budget and operation under several sunlight and eclipse cycles. Above right is the ground station setup used to communicate with the satellite.

Step 2: Software Initialization and Loading the Flight Software

Carefully following the correct sequence and procedure written in a manual, all the onboard flash memories were initialized and then the programs were loaded to microcontrollers.



Initialization of flash memories and loading the programs to respective onboard microcontrollers

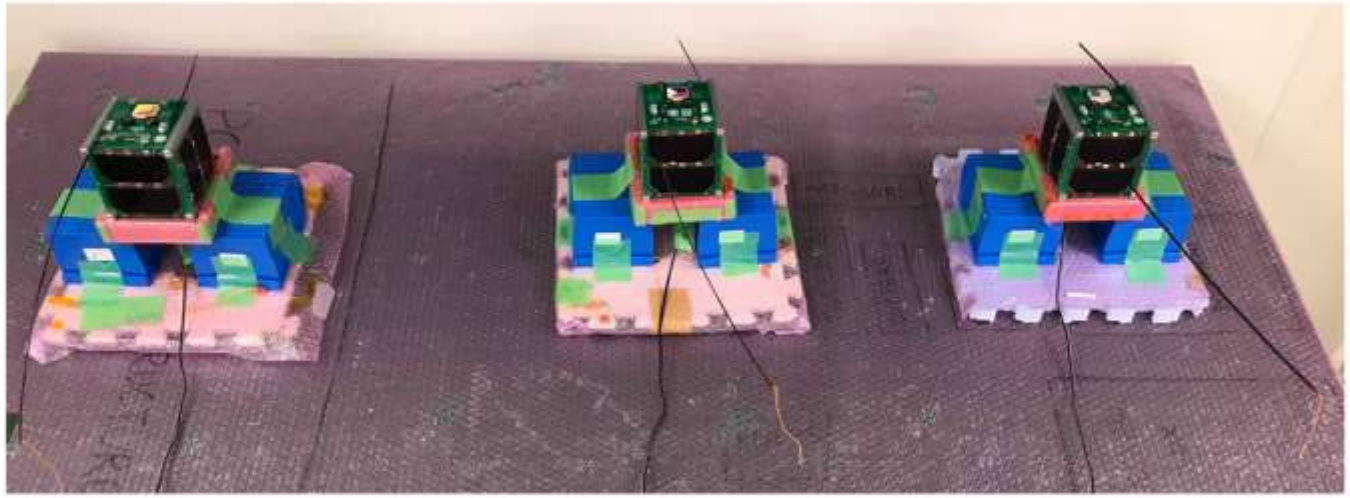
Verifying that software initialization and loading were properly done by downloading and checking the data at the ground station

Step 3: Tying of the deployable antennas using fishing wire.

After tying the antennas, everything was set for antenna deployment test!

Step 4: Antenna deployment test

Thirty minutes after releasing the deployment switches (similar to release from the ISS), all antennas deployed successfully!

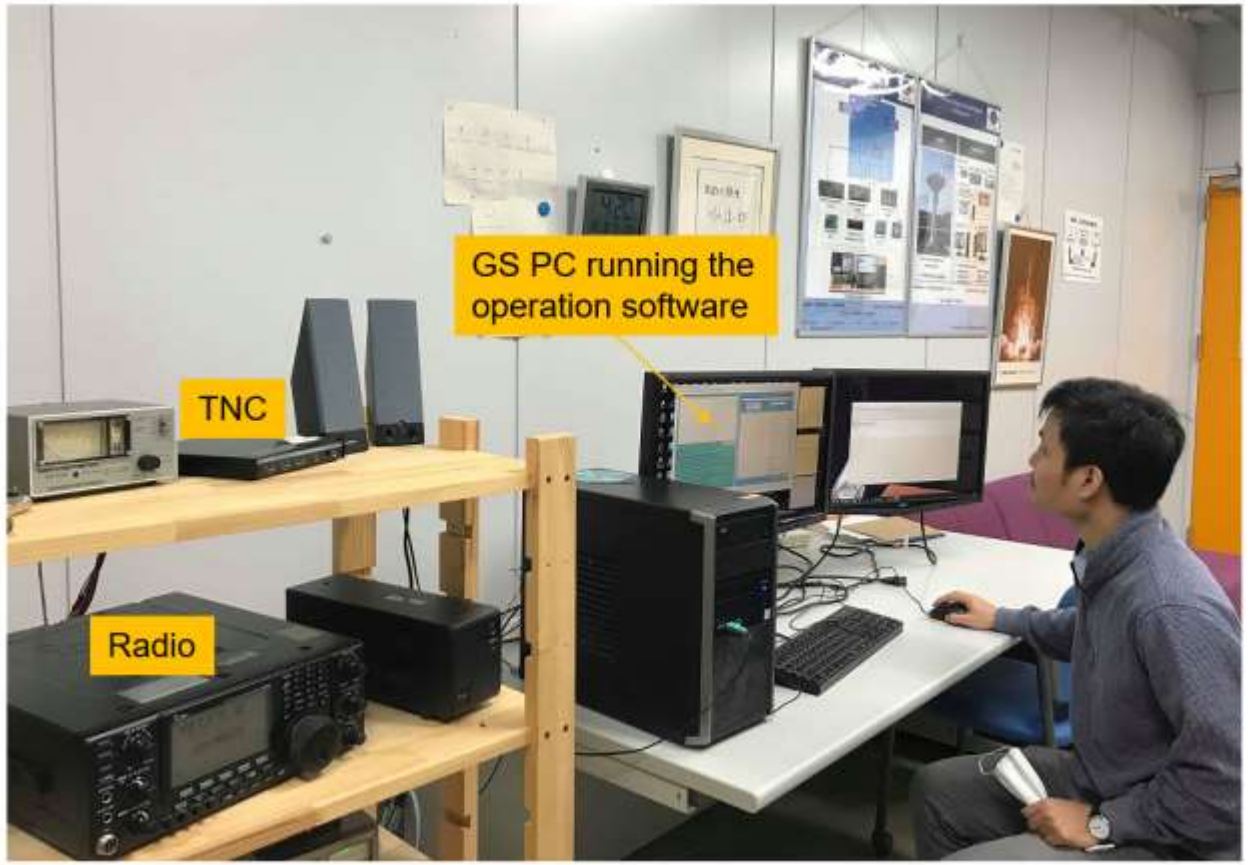


The three flight models after the successful antenna deployment test, ready for operation with the ground station.

Step 4: Satellite Operation Practice

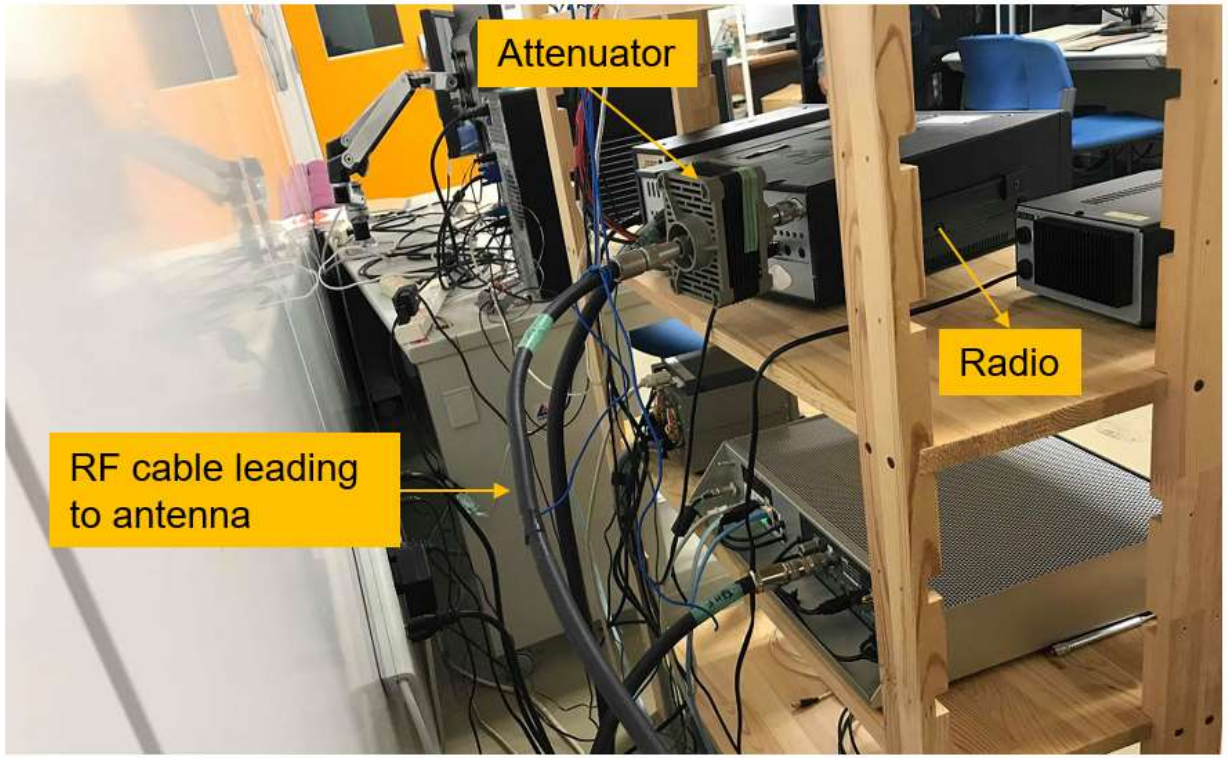
Satellite passes at each BIRDS-2 ground station (in Kyutech, UPD, UiTM and Bhutan) were simulated and tabulated. Each BIRDS-2 member was assigned as operator in a one week-long schedule.

The BIRDS ground station at Kyutech was used for the end-to-end test and practice operation.



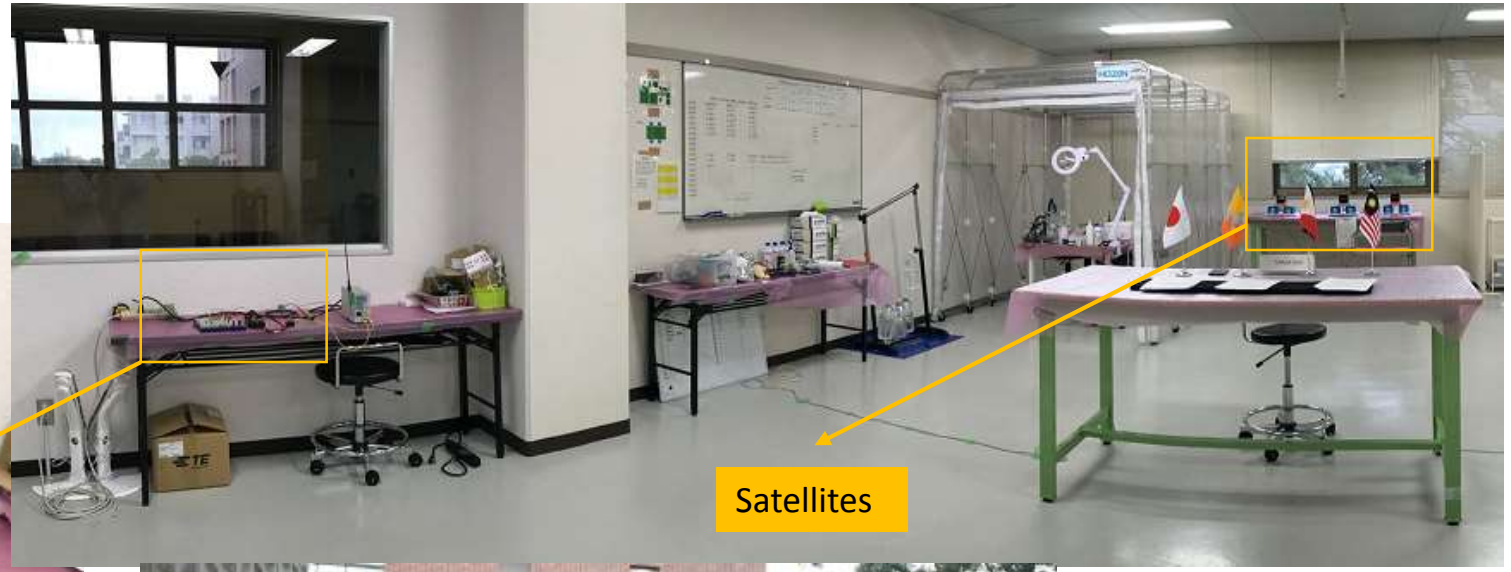
This is I while covering my operation shift. We used the BIRDS ground station in Kyutech for our operation practice.

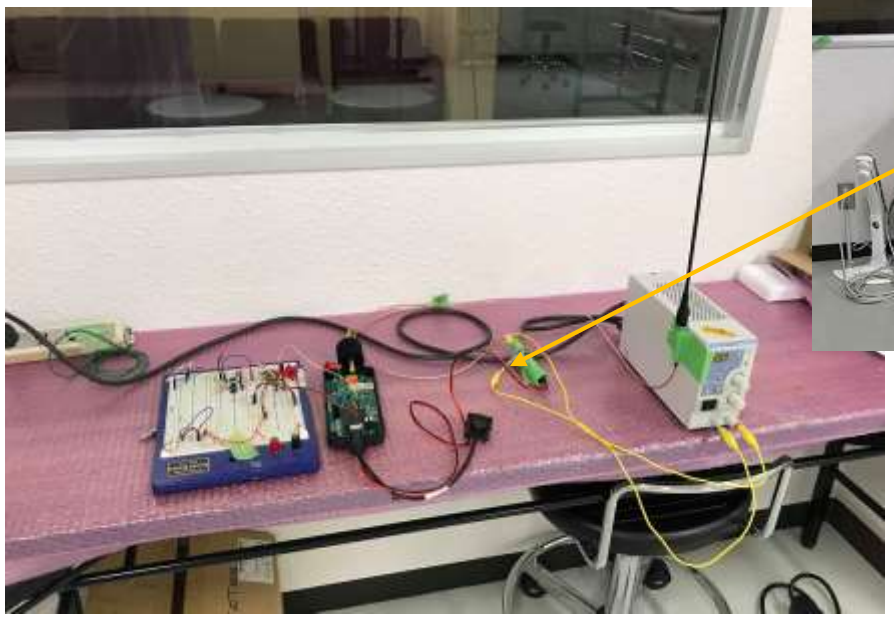
BIRDS Ground Station Setup in Kyutech



Other Photos of the End-to-End Test, GS Software and Operation Results

Panoramic view of the end-to-end test setup inside the clean room



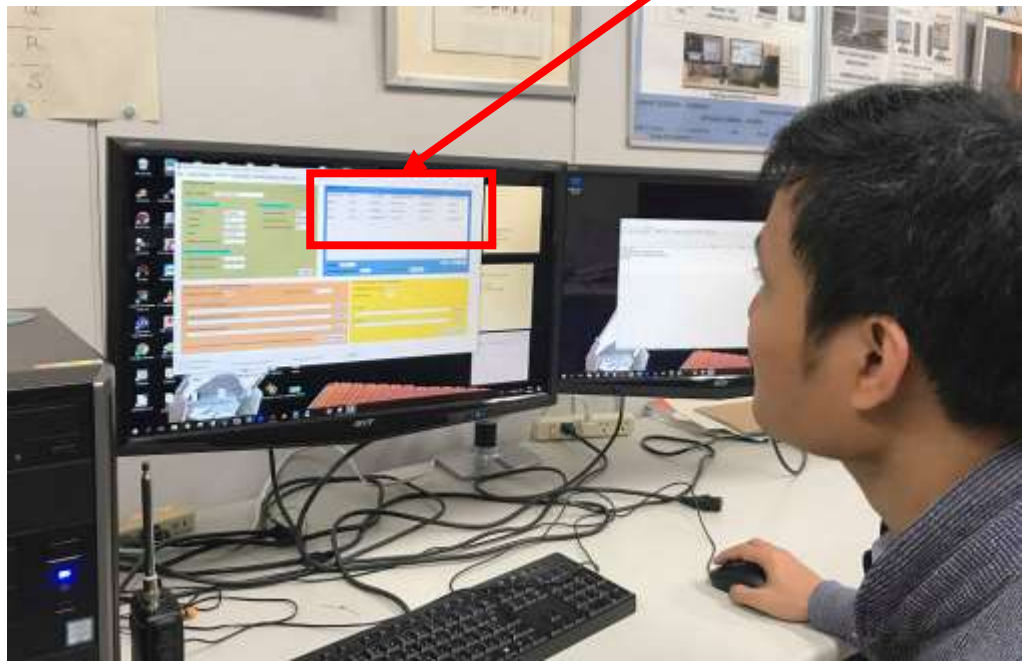


Dummy Ground Sensor Terminal to test functionality with the Store-and-Forward payload

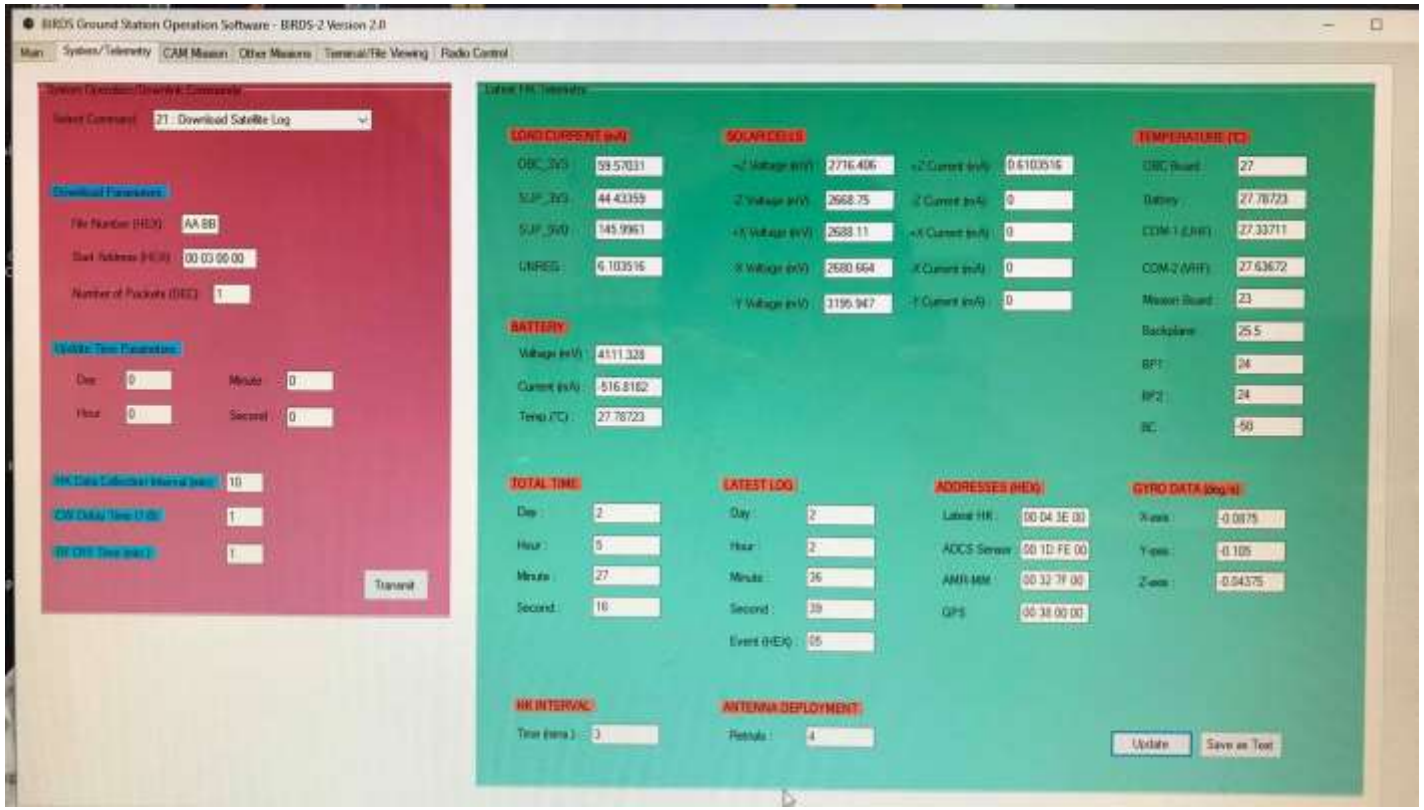
Functionality test on the APRS digipeater payload using two handheld radios

Other Photos of the End-to-End Test, GS Software and Operation Results

Image file database

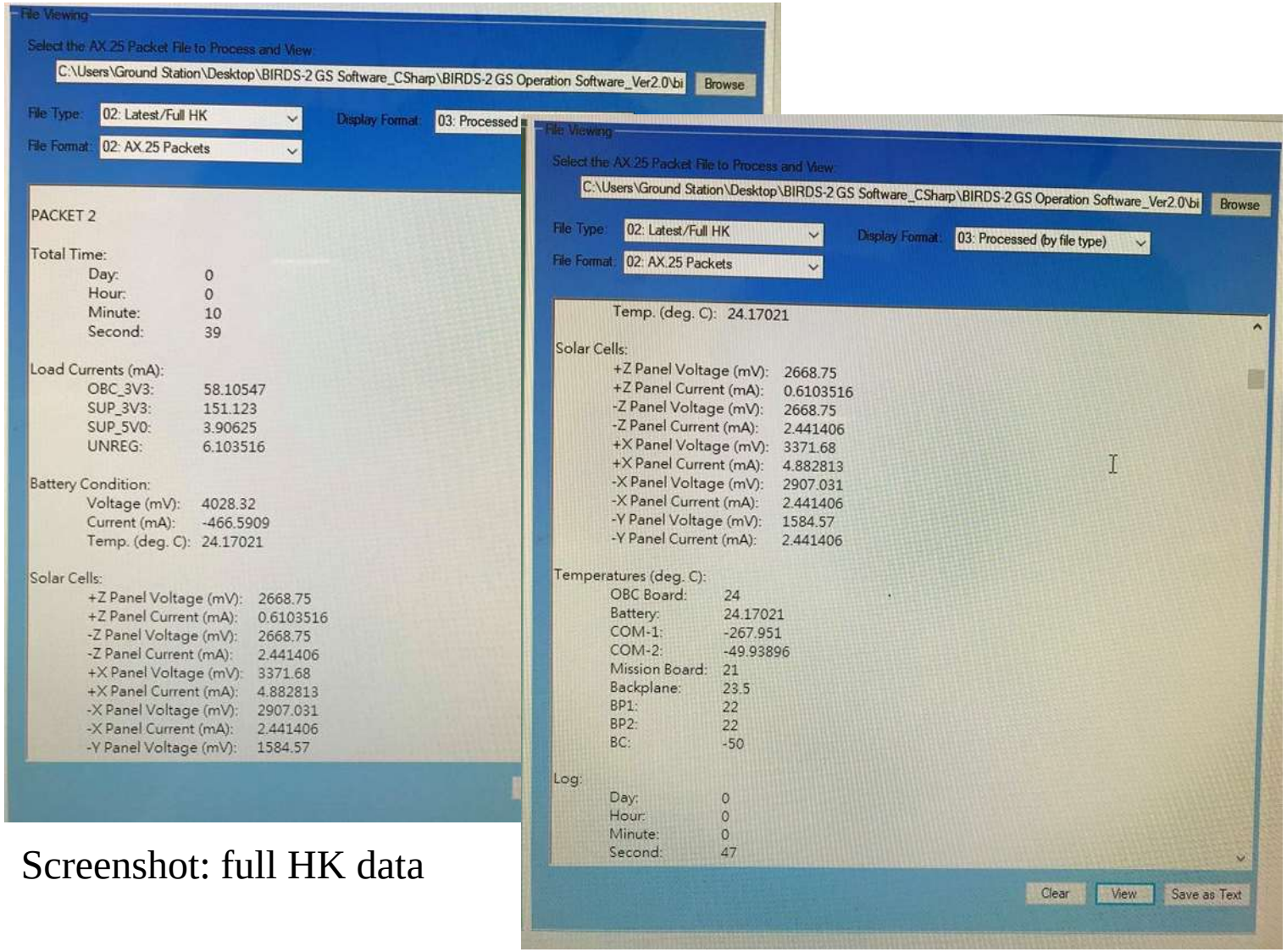


Ground station software was used to immediately process and display the results of operation such as CW beacon, latest satellite housekeeping telemetry, log, image file database, etc.

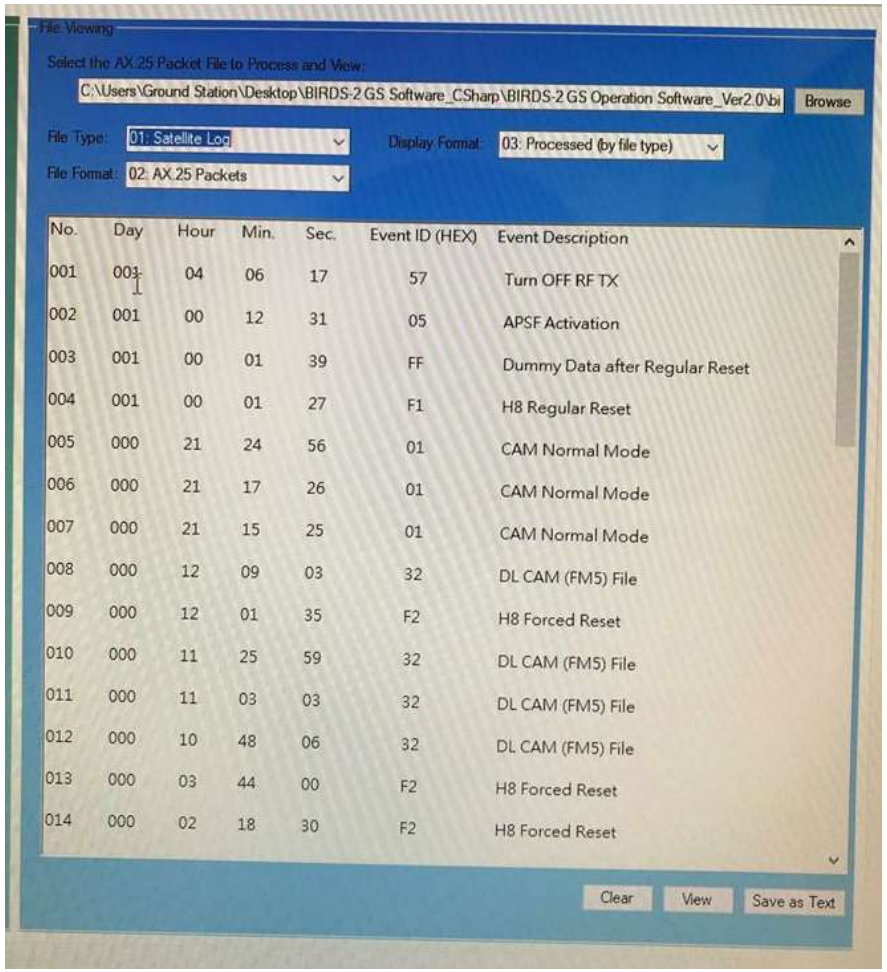


Screenshot of the GS software showing the latest HK data received and processed

Other Photos of the End-to-End Test, GS Software and Operation Results



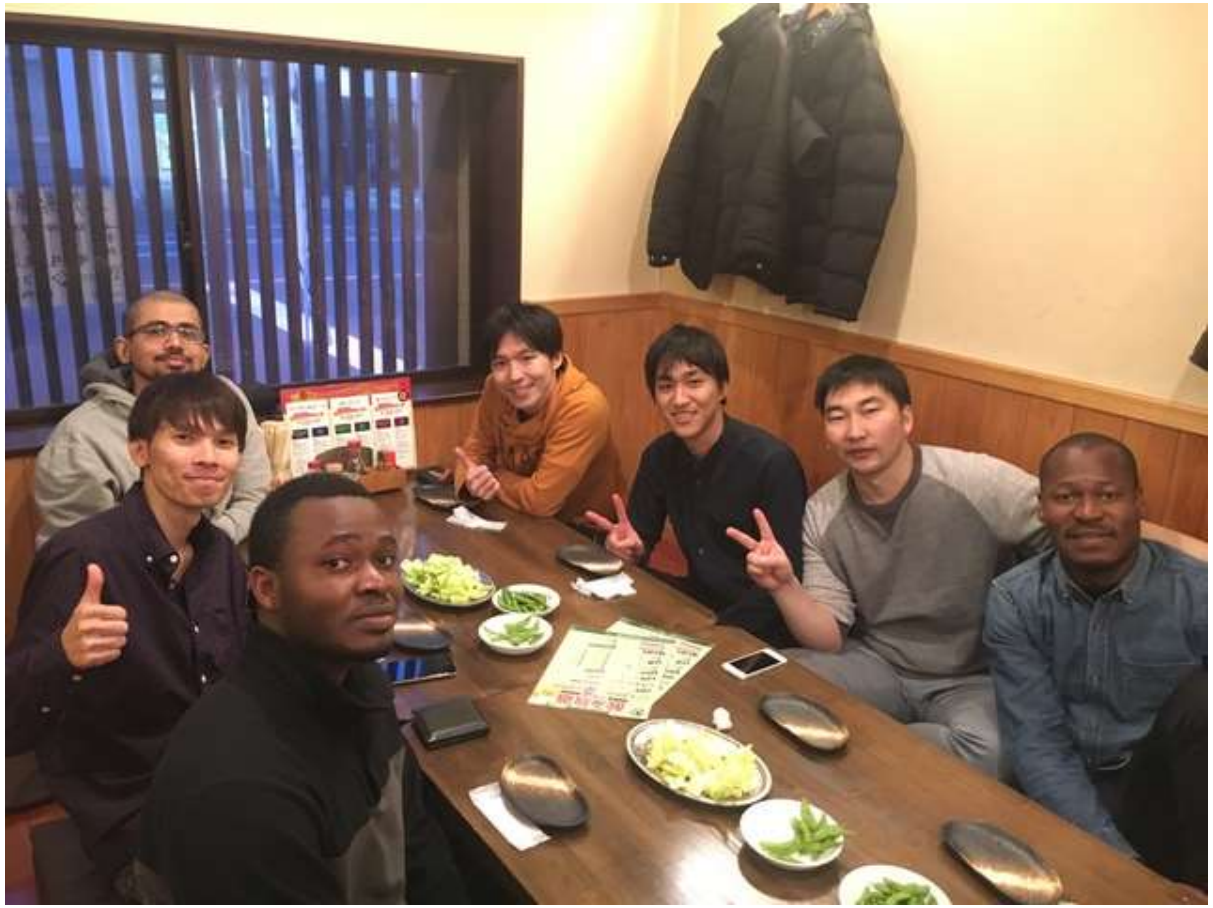
Screenshot: full HK data



Screenshot: satellite log

22. Farewell and appreciation party for Students Nakamura and Tokunaga

On 7 March 2018 BIRDS-1 members threw a party for Members Nakamura and Tokunaga for their immense contribution to the project. They soon graduate and leave Kyutech.



Venue: Yakitori Hon-Maru Restaurant
3-2-3 Nakabarunishi Tobata-Ku, Kitakyushu.
Time: 18:30 ~ 21:00

Photos by Taiwo.

Continued on the next page.

“BIRDS TEAM” in Morse Code

“til infinity” ; T-Shirt designed by Turo.

「雲のうえ」 26号　2017.2.20

23. Special Training Sessions of BIRDS-3 – Capacity Building in action

This list was compiled by Dulani of BIRDS-3.

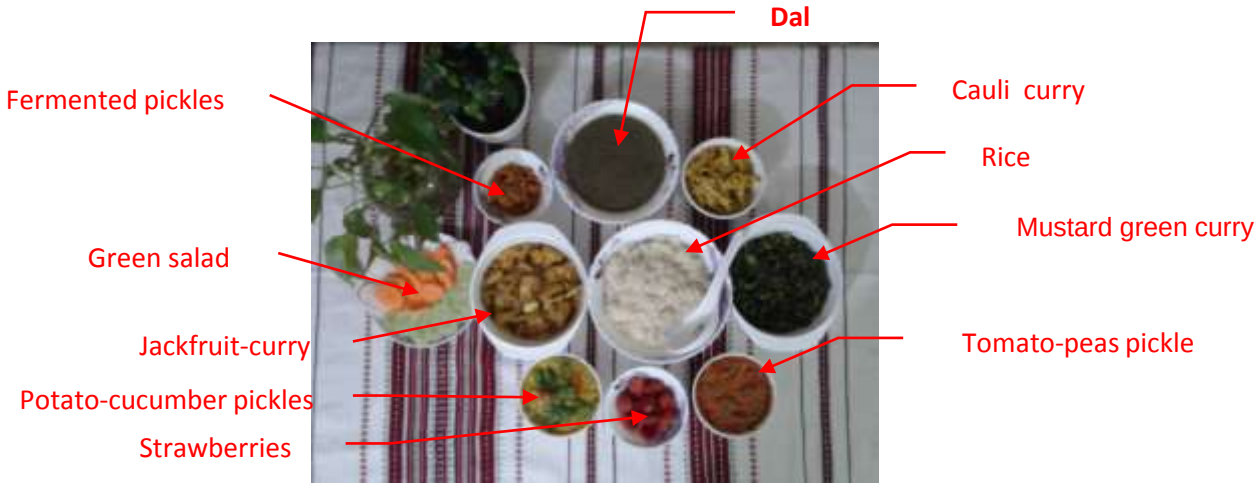
SPECIAL TRAINING SESSIONS
<BIRDS-3>

STS=Special Training Session

Event number	Date	Time	Event
STS-01	2017/10/13	10:30-12:00	PCB design session by Atomu san
STS-02	2017/10/19	14:40-16:10	Solidworks Session
STS-03	2017/10/20	13.00-14.00	PIC microcontroller workshop by Turo
STS-04	2017/10/23	13.00-14.00	Amateur Radio License Seminar by Apiwat
STS-05	2017/10/26	14.40-16.10	PCB design session 1 by Tharindu
STS-06	2017/11/2	14.40-17.00	PCB design session 2 by Tharindu
STS-07	2017/11/9	14:40-16:10	PIC programming by Atomu San
STS-08	2017/11/24	10.30-12.00	Website design session by Maisun
STS-09	2017/10/23	13.00-14.00	Amateur Radio License Seminar by Apiwat
STS-10	2017/10/26	14.40-16.10	PCB design 1 by Tharindu
STS-11	2017/12/20	13.00-15.00	PIC session 2 by Tharindu
STS-12	2018/1/10	13.00-14.00	Soldering session by Tharindu
STS-13	2018/1/11	14:40-16:10	Soldering session by Abhas
STS-14	2018/1/18	13.00-14.00	Soldering session by Tharindu
STS-15	2018/1/19	13.00-14.00	Soldering session by Abhas
STS-16	2018/1/29	13.00-14.00	Soldering session by Tharindu
STS-17	31/01/2018	13.00-14.00	Soldering session by Abhas
STS-18	2018/2/28	15.30-17.15	Main PIC session by Kiran
STS-19	2018/3/7	19.00-19.45	Camera session by Azami
STS-20	2018/3/9	13.00-15.00	Reset PIC session by Joven
STS-21	09/03/2018	14.30-16.00	Thermal software session by Nakamura

PCB Design Session,
by Tharindu (BIRDS-3)
on 2 Nov. 2017

24. "Dal Bhat" -- food of Nepal



This photo shows the typical Nepali vegetarian culinary “Dal-Bhat”, prepared at home on the auspicious occasion of the World Women Day on 8th March 2018. This meal, eaten normally twice a day, consists of Dal (black lentil soup), Bhat (basmati rice), Tarkari (three separate curries: made of fresh mustard green spinach, jackfruit and cauliflower), Achars (thee pickles: made of fresh-tomato with green peas, potatoes with cucumber and green coriander, and traditional fermented pickles; a mix of cabbage, tomatoes, chili, pepper, garlic, ginger, oil and spices). Green salad of fresh radish, cucumber and carrot and fresh fruit-strawberries can be added to taste. This combination is popular not only in the homes, but also at parties, restaurants, and hotels.

Bon Appétit!

“Dal Bhat”

-- food prepared and picture taken by:
Sarita Shrestha Maskey

End of this **BIRDS Project Newsletter**

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http://www.birds-project.com/birds1/newsletter.html

Logo for the **BIRDS Int'l Workshop** of this year in Mongolia [designed by Turo]

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.