



# BIRDS Project Newsletter



**Issue No. 13 (24 Feb. 2017)**

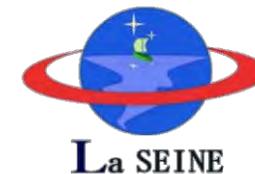


Members of BIRDS-1 and BIRDS-2 Teams (Tobata Campus)

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

*Edited by:*

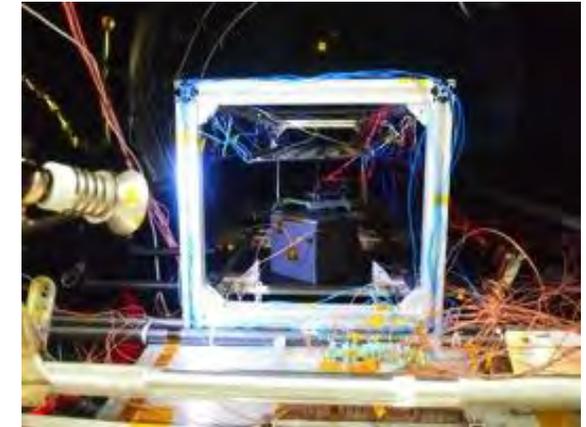
G. Maeda, Tejumola Taiwo, Joven Javier, M. Cho,  
Laboratory of Spacecraft Environment Interaction  
Engineering (LaSEINE)  
Kyushu Institute of Technology (Kyutech)  
Kitakyushu, Japan



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

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Heating a satellite from four directions

Part of thermal vacuum testing of flight models --- organized by Student Nakamura from 01 to 12 January 2017 at facilities of Kyutech.

# 1. Visiting scholars – welcome Dr. Werner Balogh of the UN Office for Outer Space Affairs

In an effort to provide world-class, graduate-level education to BIRDS and SEIC students, we invite overseas scholars/experts to Kyutech to teach special courses. In January, Dr. Balogh arrived to teach a 2-credit course entitled *The International Dimension of Space Activities: Space Law and Policy for Engineers*. Over 35 SEIC students signed up for it – the course is a hit.



Space  
Engineering  
International  
Course

Werner upon arrival at Kyutech -- shown here with Ms. Kennedy, who is the administrative coordinator for SEIC (Space Engineering Int'l Course).



The first lecture (12 January 2017) gave the historical background to space flight and to space law.

## 2. Space Engineering Seminar of SEIC

**Presenter:** Ernest Teye Matey



**Profile:** Ernest Teye Matey is a Master student in the Laboratory of Spacecraft Environment Interaction Engineering. He holds a B.Eng. from the All Nations University in Ghana. He is a founding member and the outreach coordinator of the Space Science Technology Laboratory (SSTL), spearheading space activities in Ghana.

**Date/time of seminar:** Thursday, 12 January 2017, 12:10 PM.

**Location of seminar:** Room S2-405, 4<sup>th</sup> floor, General Research Bldg. No. 1.

(This is the Cho Lab Seminar Room, at the end of the hall.)

**Title:** Enhancing Outreach Activities for University Satellite Projects.

### **Abstract:**

The need for Space and Satellite projects to not only achieve its orbital missions but to make meaningful impact in societal education has raised the need for project developers to have comprehensive plans and schedule for outreach activities. However, the system Engineer may be short of ideas on how to initiate, maintain and expand such activities to its full exploit. Let's meet, discuss and generate ideas on how outreach activities for University Satellite Projects can be enhanced as we share our experiences, evaluate some plans and probe the existing approaches.



All SEIC students are required to conduct one time this seminar. On 12<sup>th</sup> January 2017, Ernest (Ghana/BIRDS-1), conducted his seminar; see left and below for the abstract of his talk. This particular seminar series makes use of the Lunch Hour, and there is roughly one seminar per month. This seminar series is managed by Assistant Professor Kim.



**Ernest and his opening slide on 12<sup>th</sup> January in the Cho Lab Seminar Room.**

### 3. The +Y side of each BIRDS-1 satellite has a special “country pattern”

## +Y Side Board For Each Country

Suggested by each country and then  
crafted by Kafi (Bangladesh/BIRDS-1)

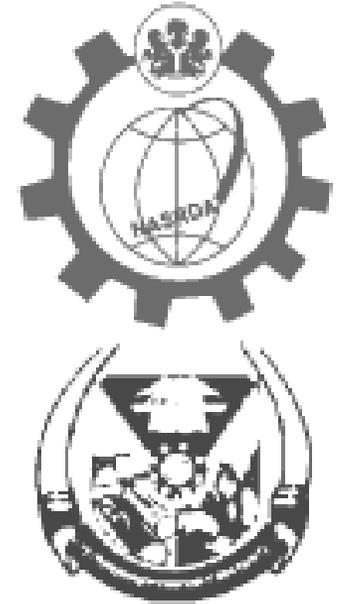


**View the next five pages  
(one for each satellite)**

# NIGERIA



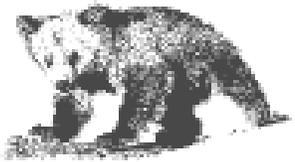
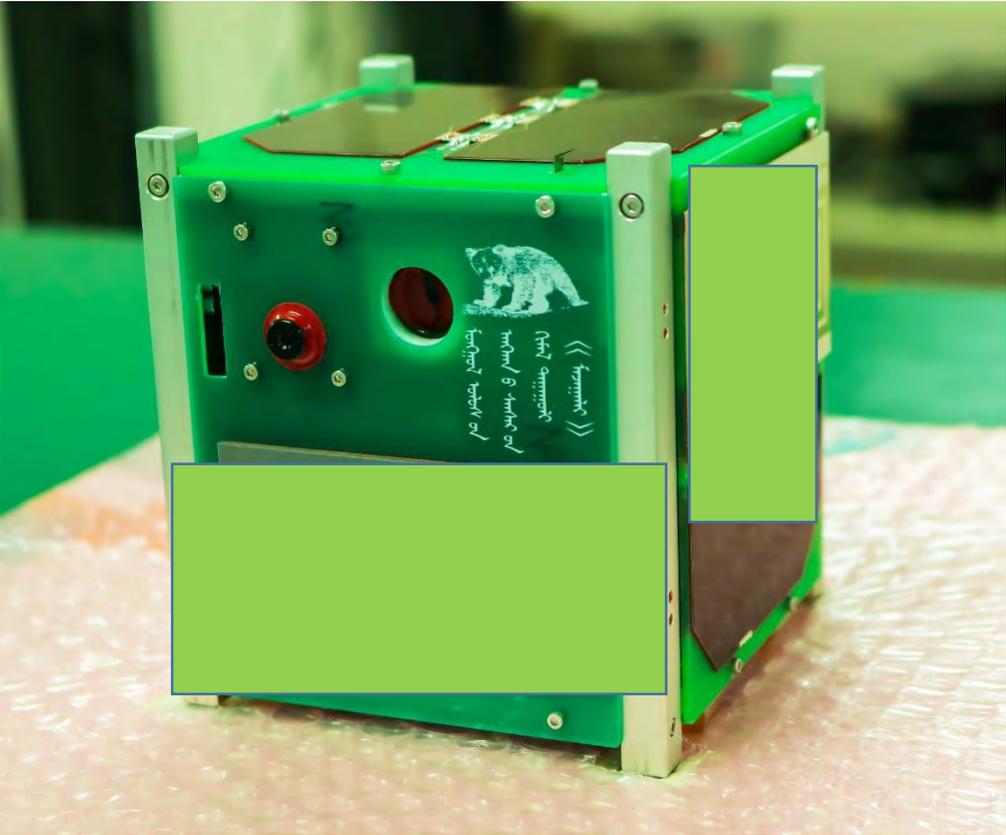
NigeriaEduSat-1



UHF Patch Antenna

# MONGOLIA

Explanation of this bear:  
See Page 8 of Newsletter No. 9



Увсний / Увсний / Увсний  
Увсний / Увсний / Увсний  
Увсний / Увсний / Увсний  
Увсний / Увсний / Увсний

UHF Patch Antenna

# JAPAN



## TOKI

UHF Patch Antenna

# GHANA



GhanaSat 1



UHF Patch Antenna

# BANGLADESH



আমার সোনার বাংলা  
আমি তোমায় ভালবাসি।



Inspiring Excellence

বাংলাদেশের প্রথম ন্যানোস্যাটেলাইট  
ব্র্যাক অশ্বেষা



UHF Patch Antenna

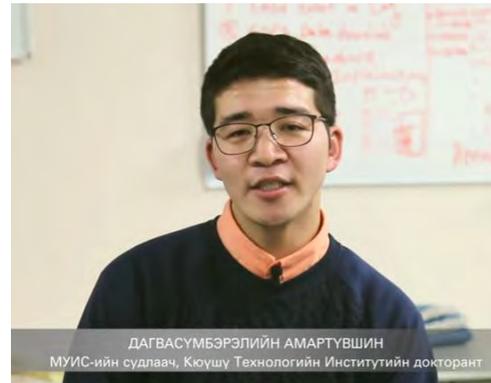
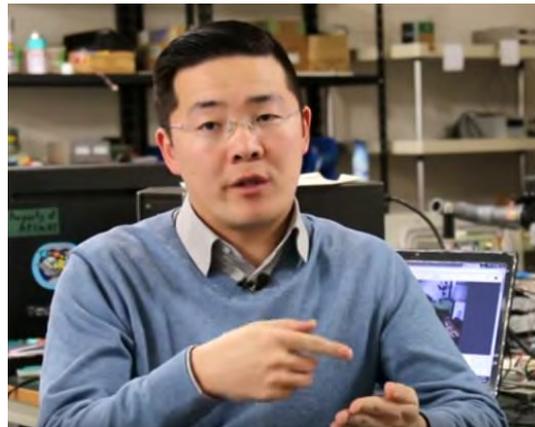


Centurions

## 4. BIRDS Project discussed on nation-wide television in Mongolia



As described in **BIRDS Newsletter No. 12** (Article #6, page 11), the Mongolian National Broadcaster (MNB) came to Kyutech to produce a story about BIRDS. You can view it here: [https://www.youtube.com/watch?v=O5SmSz-m\\_pg&feature=youtu.be](https://www.youtube.com/watch?v=O5SmSz-m_pg&feature=youtu.be) (30 minutes in length – spoken in Mongolian language)



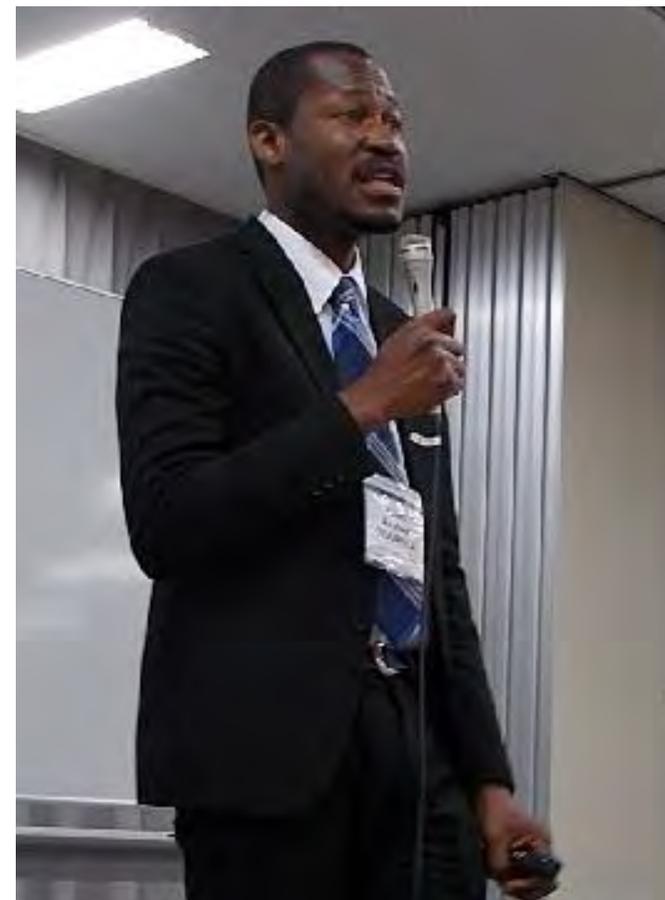


## 5. BIRDS Students Turo and Taiwo give 20-minute talks at lean satellite standards workshop in Tokyo

Title of the workshop:

*International Workshop on  
lean Satellite Standardization  
– 2017*

*See the next 2 pages for  
more details on this  
standards workshop.*



**Turo's talk:**

“Experiences of a proposed bus interface standard applying for CubeSat Constellation”

**Taiwo's talk:**

“Lean Satellite Project as a Sustainable Model For Developing Countries Space Program”

## 6. International Workshop on lean Satellite Standardization – 2017



Ms. Faure (Kyutech)  
“Lean satellite programs: schedule,  
cost, and reliability trade-off”

Location:

**Tokyo**

Dates:

**16-18 January 2017**

Organizers:

**Kyutech, JSS, Cabinet Office**



Dr. Yamauchi (Kyutech)  
“Safety design and verification for lean satellite”



Question from Steve Greenland

Viewing the live broadcast of the deployment of **Aoba-Velox-III** from the ISS. It was very dramatic.

Photos by Dr Kim on 16 Jan 2017



Prof. Low (NUS) and G. Maeda at reception.



Dr Masui at deployment press conference



## 7. Call signs are given to BIRDS-1 !

*The BIRDS-1 satellites have been issued **call signs** – which means they have permission to use certain amateur radio frequencies once they are in space. It is the custom to make public the call signs once they are in space.*

This is a good time to mention the need for frequency coordination for cubesats. See this editorial from **SpaceNews** of 28 October 2013.

### Editorial | Cubesats Need Coordination Too

by SpaceNews — October 28, 2013



In the midst of the cubesat revolution that is opening up a whole new world of space applications to people and organizations of ordinary means comes a reminder from the International Telecommunication Union (ITU), which is responsible for regulating and coordinating radiofrequency transmissions of all types: The existing rules requiring ITU member states to register their satellite systems do not discriminate based on size.

That means, in a nutshell, that cubesats and other nanosatellites, like their larger operational cousins, must be entered into the ITU-managed database of satellite frequencies and orbital slots. Speaking at the International Astronautical Congress in Beijing, officials with the United Nations-affiliated ITU noted that cubesats draw on finite spectrum — however marginally — and have the potential to interfere with one another and with other systems. These officials urged ITU members to register cubesats and other microsatellites at least two years before launch.

It might be tempting to dismiss these ITU officials as overzealous bureaucrats bent on throwing a regulatory wet blanket over the cubesat party, especially given the organization's spotty track record when it comes to enforcing its rules on traditional satellite services. But they are absolutely correct: Cubesat transmissions need to be properly coordinated for the good of everyone concerned. **[continued next page]**

The reason is simple and obvious: As the popularity of cubesats grows, so does the potential for interference.

By all accounts, the cubesat business is booming. According to one expert assessment, some 60 cubesats are slated to be deployed over the next few months, beginning with more than 20 aboard a Minotaur rocket to be launched in mid-November from NASA's Wallops Flight Facility in Virginia. If these deployments are successful, the result will be a 50 percent increase in the number of cubesats orbiting Earth.

Not only are cubesats proliferating, their missions are becoming increasingly complex. Most cubesats today operate in a frequency band set aside for so-called amateur radio services, which can accommodate low-data-rate transmissions. But as applications become more bandwidth intensive, operators will increasingly be forced to seek out spectrum in other bands. Moreover, though cubesats today typically are allocated bandwidth on a secondary-user basis, meaning they have to work around primary users, there is no reason such missions could not be granted primary-user status.

In the United States, which is leading the surge in cubesat activity, the Federal Communications Commission (FCC) licenses all nongovernment satellites regardless of size and, once the license is issued, registers the associated frequencies with the ITU. This information is entered into the ITU's Master International Frequency Register, the database used to coordinate the world's myriad radiofrequency services.

For cubesats operating in the amateur bands, the FCC relies on the International Amateur Radio Union (IARU) for frequency coordination — typically the operator must submit a coordination letter from the group with its license application. But the flood of activity threatens to overwhelm the small, volunteer organization: Of the cubesats slated to deploy through the remainder of the year, 40 are being coordinated by the IARU.

The ITU requirements are hardly onerous. The cost to register a network is only \$626 — these fees enable the ITU to maintain its master database — and operators have seven years from the time of registration to begin broadcasting in those frequencies to stay within the rules.

The FCC and other state administrations that interface with the ITU should take steps to ensure that cubesat missions do not slip through the cracks as they juggle their ever-more-demanding workloads.

Operators of cubesats and other small satellites, meanwhile, can help themselves by heeding the ITU's request for ideas on how these systems should be handled given their unique attributes. The ITU would like to have these proposals in time for the 2015 World Radiocommunication Conference, which sets international regulatory policy for frequency use.

The cubesat community and its government representatives should embrace ITU registry. Far from hindering the growth in cubesat applications — with the attendant scientific, educational and economic benefits — comprehensive ITU coordination will help ensure that this enterprise does not become a victim of its own success.

**End of Editorial**



# 8. Students (including BIRDS-2) visit Karato Fish Market for Japanese cultural experience



Departure from Kyutech rail station



Sunday, 22 Jan 2017



Ferry crossing



## 9. Dr Donkor (President of ANUC, Ghana) visits Kyutech for planning discussions

During 23-25 January, with his son Samuel (Jr.), Dr Donkor came to Kyutech for various discussions as shown in these photos. Strategy and future plans were discussed in detail during these 3 days. **We thank Dr Donkor for undertaking this journey to this corner of the world.**



Dr Balogh (UNOOSA) has a meeting with Dr Donkor



President of Kyutech shakes hands with Dr Donkor



Samuel, Dr Donkor, Prof Cho, in the BIRDS Clean Room



Dr Donkor poses with GhanaSat flight model



Having dinner in Kokura of Kitakyushu City

## 10. Mr Korpong of King Mongkut's University (N.Bangkok) visits Kyutech and BIRDS



Mr Korpong Maneeratphairoj (right) gives G. Maeda (left) a souvenir from KMUTNB.

Mr Korpong is an international relations officer of Apiwat's university in Thailand. On 31 January 2017, Apiwat and three Thai SEIC students (Aekjira Kuyyakanont, Phongsakorn Meemak, and Pasut Pattamanirunkul) gave him a guided tour of LaSEINE and BIRDS facilities.



1959



- KMUTNB, was established from the constructive cooperation between the Thai Government and the Federal Republic of Germany, it was initially known as the 5North Bangkok Technical School6 but generally called "Thai-German Technical School."

<http://www.kmutnb.ac.th/en/introduction.php>

# 11. Developer of BIRDS-1 and -2 patch antennas invited as a keynote speaker

The 5th IIAE International Conference on Industrial Application Engineering 2017  
ICIAE2017 Kitakyushu International Conference Center, Kitakyushu, Japan  
March 27-31, 2017

Keynote Speakers



**Prof. Mohammad Tariqul Islam**  
Universiti Kebangsaan Malaysia, Malaysia

Title **Performances Analysis of Material Antenna in Microwave Imaging Application**

## ABSTRACT

In recent years microwave imaging has earned immense interest in several clinical investigations which can detect tumor with size of 5–10 mm along with 80%–90% accuracy. The microwave imaging is a nonionizing and cost effective approach with sufficient penetration into breast tissue for breast cancer tumor detection. Recently, flexible materials such as polydimethylsiloxane (PDMS), liquid crystal polymer, organic material, liquid metal, fabric and paper have earned immense interest in microwave breast imaging due to the possibility of any arbitrary shape.

The **BIRDS Project** is pleased to announce that **Prof. Tariqul**, a visiting scholar from UKM (Malaysia) and developer of BIRDS antennas, has been invited to **ICIAE2017 in Kitakyushu, Japan**. It is good news.



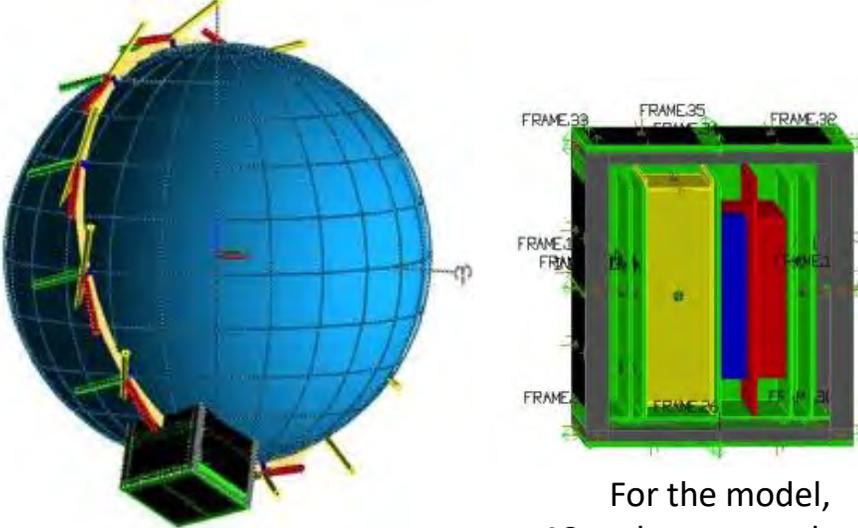
<http://www2.ia-engineers.org/iciae2017/>

## 12. Thermal vacuum test of BIRDS-1 Flight Models --- 4 units simultaneously

Theoretical and experimental evaluation of thermal vacuum testing was performed by **Student Nakamura**. He designed a method for testing multiple CubeSats simultaneously because there is not sufficient time to do it one by one.

	Worst hot	Worst cold
altitude	400km	
$\beta$ angle	75°	0°
Sun flux	1400 W/m <sup>2</sup>	1312W/m <sup>2</sup>
albedo	40%	30%
IR emitting	260 W/m <sup>2</sup>	210 W/m <sup>2</sup>

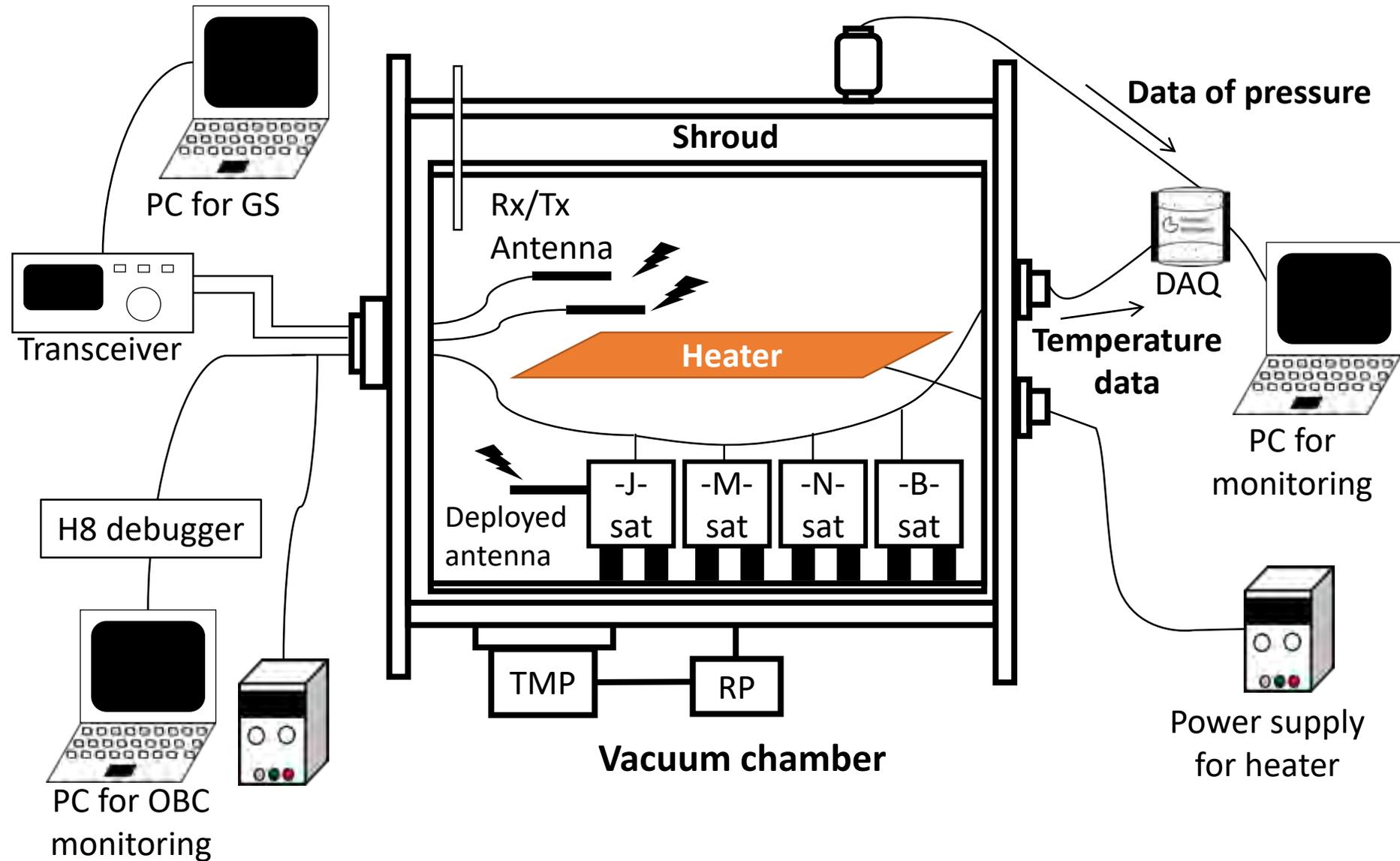
Flight models must be tested for worst-case hot conditions and worst-case cold conditions.



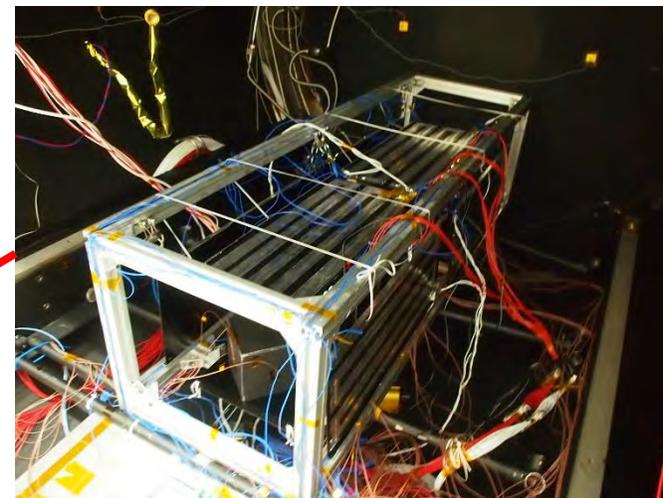
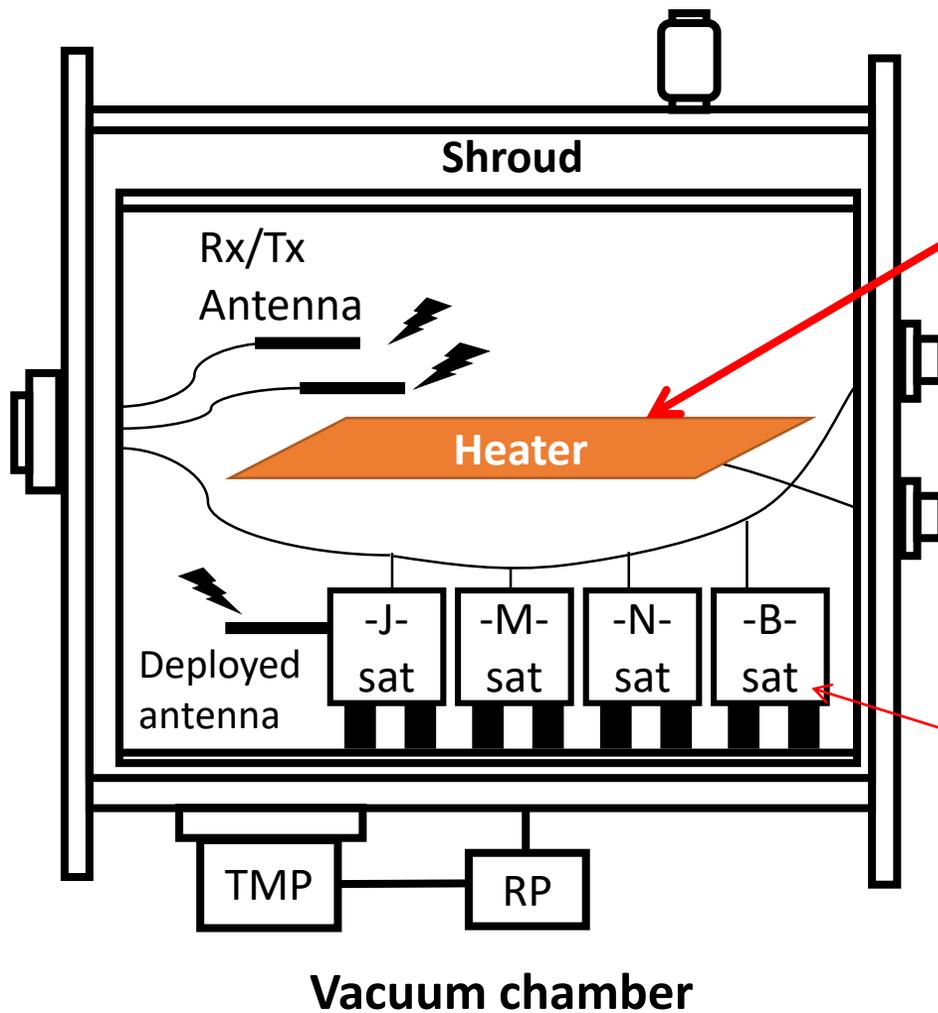
For the model, 46 nodes are employed.

- ◆ Thermo mathematical model
  - Components : external panel, internal boards, Battery
  - Number of nodes : 46 nodes
  - Surface characteristic, Capacity is defined for each 46 nodes.

# Configuration for testing 4 BIRDS-1 satellites simultaneously



## More details on the configuration . . .

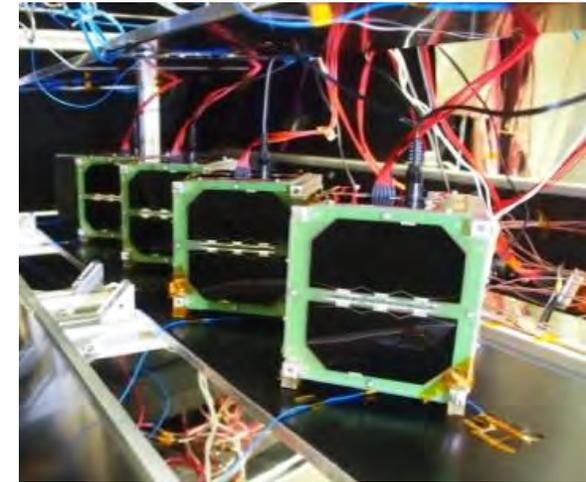
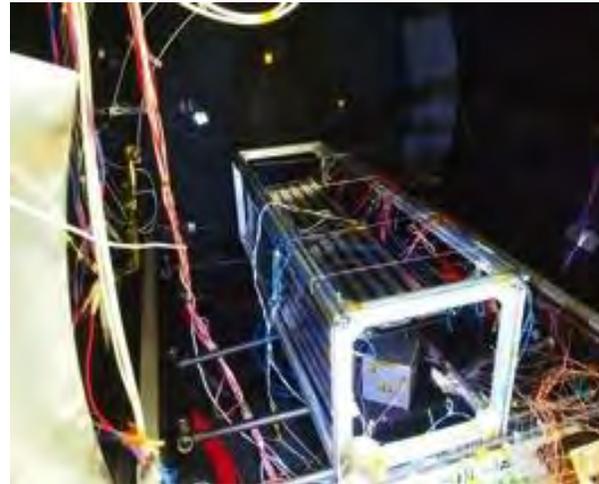
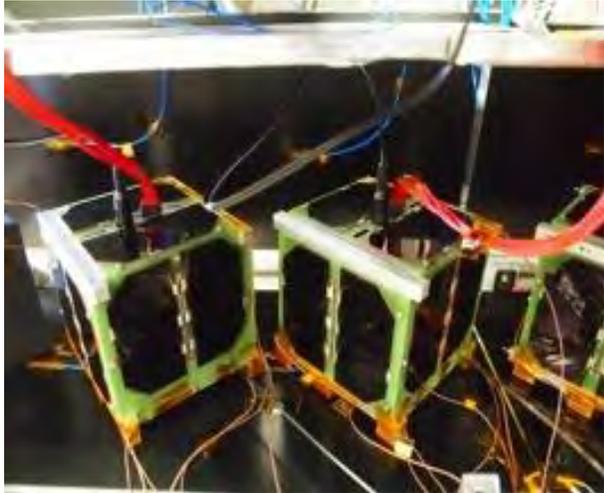


Heater gauge



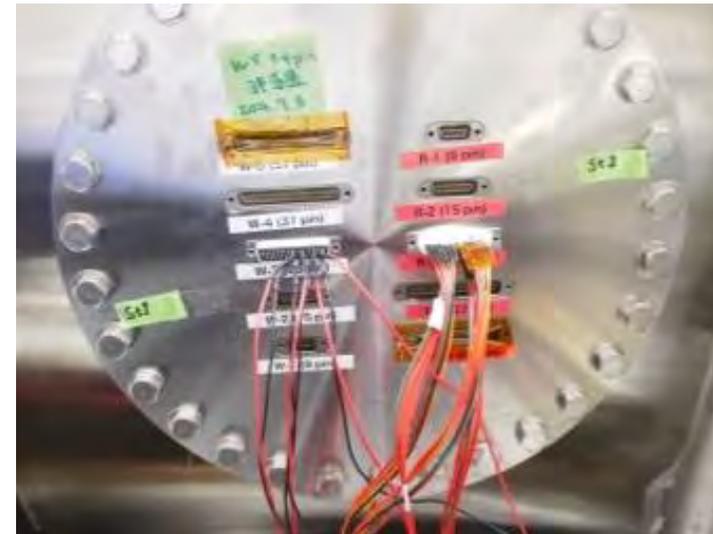
Four satellites and two dummies

The red cables are for connection to power supply and to the monitoring systems.



## Thermal Vacuum Test Chamber

The simultaneous test of four BIRDS-1 flight models occurred on 11<sup>th</sup> January 2017 from 9:00 to 23:45. All photos courtesy of Student Nakamura.



## 13. BIRDS Antenna system test and development

This report (the next 4 pages) was written by Antara and submitted on 20 Feb. 2017.

- 1 VHF Patch Antenna For Receiving Unit
- 1 UHF patch for Transmitting Unit
- 1 UHF Deployable Antenna for Transmitting

Deployable monopole Antenna

UHF Patch Antenna

VHF Patch Antenna



BIRDS Antenna System

# Tests performed for antenna system

## Basic Parameter check for Antenna:

1. Radiation pattern Test in Anechoic Chamber
2. Antenna Functionality check with other systems of satellite

## Launch Conditions:

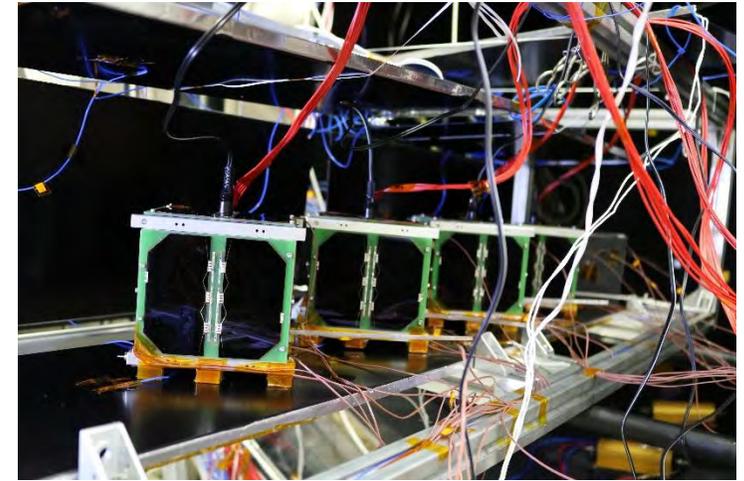
1. Vibration Test

## Environment Conditions:

1. Vacuum Test
2. Thermal Vacuum Test

## Antenna Compatibility test with other subsystems:

1. Antenna deployment Test & RF Transmit Test
2. Long Distance Test
3. End To End Test



*In thermal Vacuum chamber to check antenna performance to meet requirement during high and low temperature which is the expected environment of space*



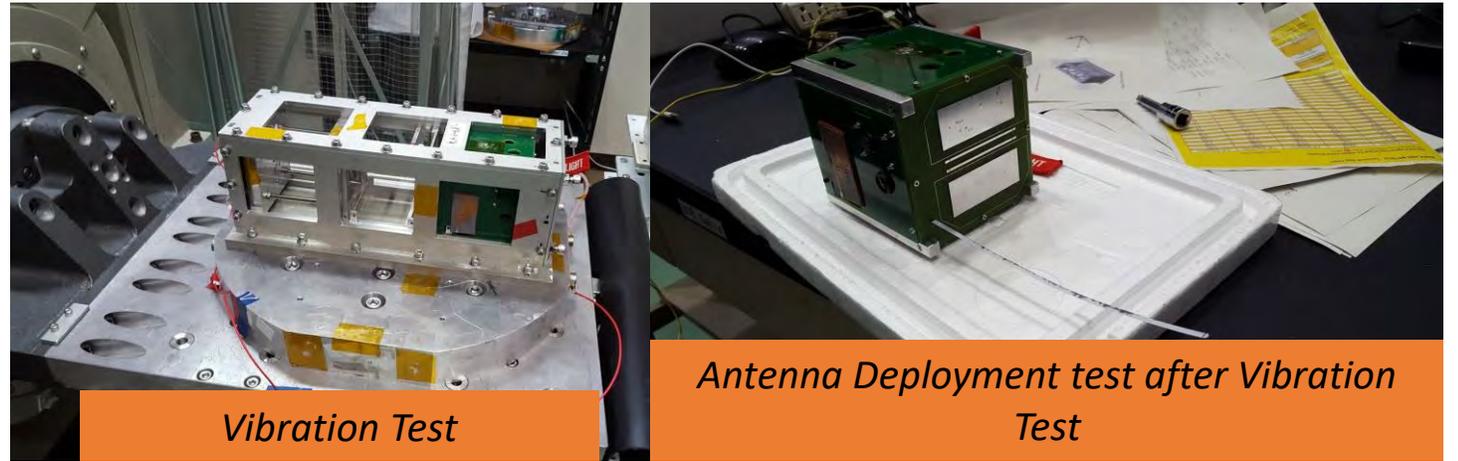
*Vacuum chamber---to check whether antenna will work under vacuum condition or not*



**Long Distance test-** To simulate the same distance as close to BIRDS Satellite altitude in worst case scenario (distance of 1500km) and verify BIRDS satellite uplink and downlink communication by Antennas



End To End Test



Vibration Test

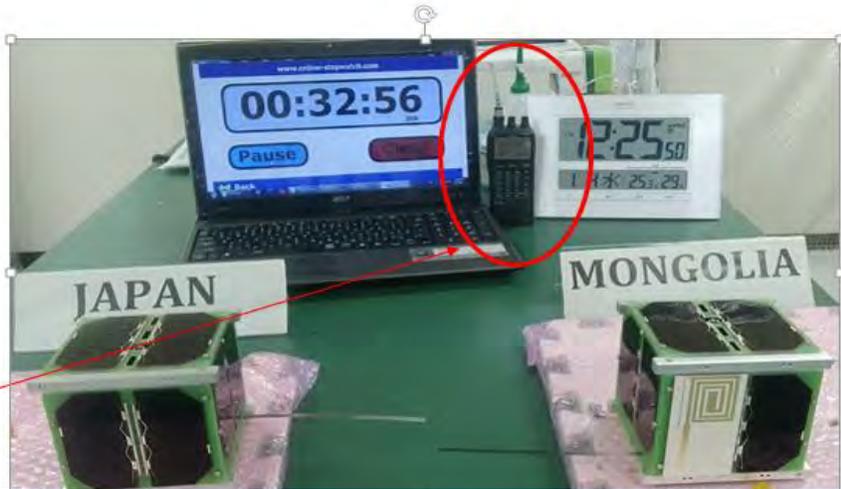
Antenna Deployment test after Vibration Test

**Vibration Test-** To demonstrate the ability of the satellite antenna system; specially deployment mechanism to meet qualification requirements under vibration conditions which simulate the prediction for flight.

Success Criteria:

- No malfunctions occurred during excitation and after excitation for the deployment system.
- Antenna will not come out during any vibration conditions and After vibration antenna was in exact position as it was before vibration.

**End to End Test:** To verify uplink and downlink communication between satellite and ground station



Antenna deployment Test & RF Transmit Test

### Antenna deployment Test & RF Transmit Test:

This test will also confirm about the safety level that is taken for the Hazard Control. The RF transmission test shall demonstrate system performance verification testing of satellite to meet qualification requirement of Releasing from International Space station (ISS).

Success Criteria: Antenna will deploy after 30 minutes removing RBF.

RF will start transmitting after 30 minutes.

Corresponding signal will be confirmed by transceiver.



Anechoic chamber Test

UHF/VHF antenna test for BIRDS satellite demonstrate the test to measure the radiation pattern, gain and VSWR from the antenna attached with the satellite.

# Preparing Antenna Deployment System for Flight model



1<sup>st</sup> day of Flight Model development. 5 countries started working to develop flight model of Antenna deployment mechanism

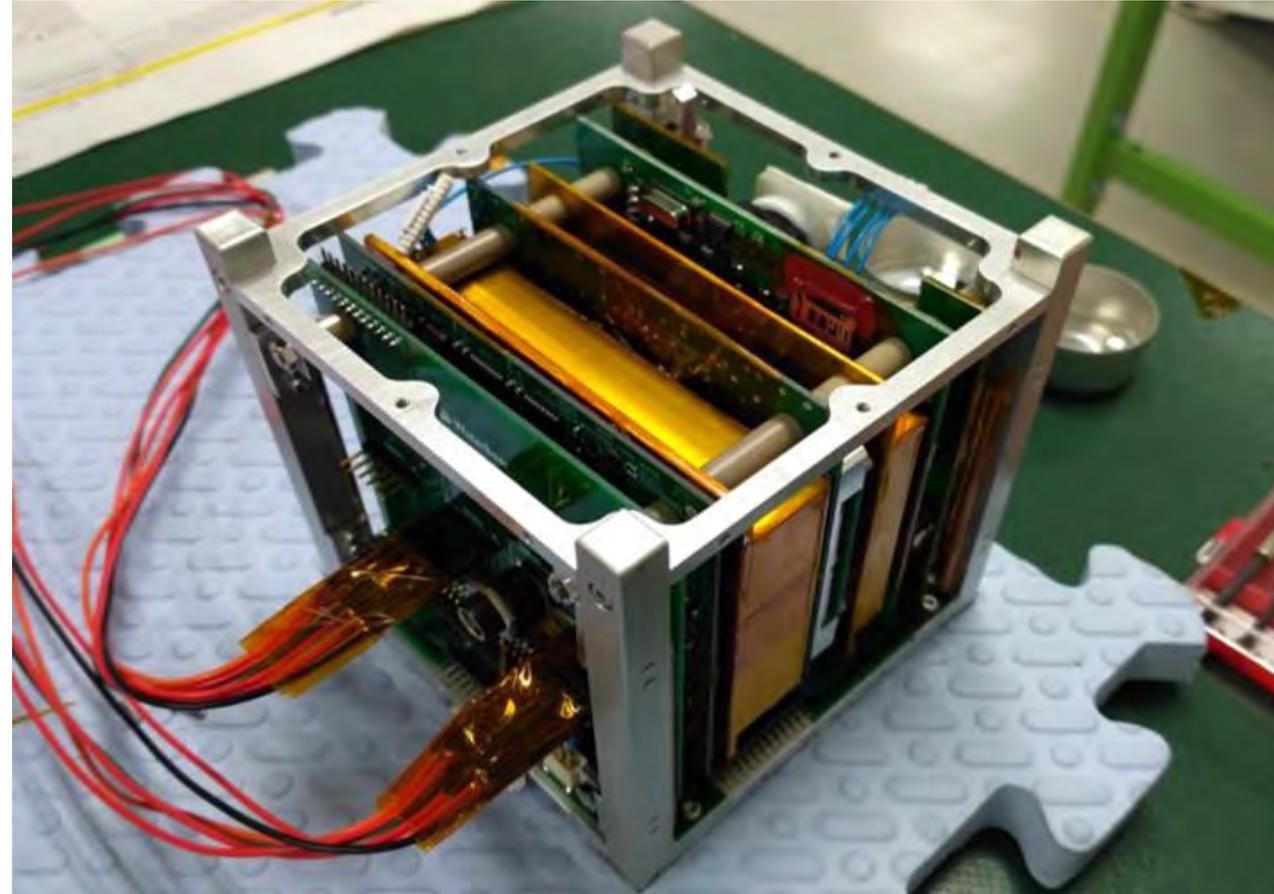


During FM development, every day team selected a “core person” who guided about the task of that day. “core person”- the person who knows much about the system that the team will work on the following day. This core person was selected according to the task schedule. Antara was core person for that day.

## 14. FM Integration and Vibration Testing

This report (the next 3 pages) was written by Ibukun and submitted on 19 Feb. 2017.

For more detailed information on vibration testing, see **BIRDS Project Newsletter** Issue No. 7, pages 29-33. This was also written by Ibukun (who is from Nigeria).



FM with umbilical cords

# Flight Model Assembly and Integration

On successful completion of the different satellite subsystems, each team (Country) is finally ready to assemble and integrate their satellites. To ensure successful satellite integration, persons responsible for each subsystem prepare a detailed assembly procedure.

The satellite integration process refers to all tests, processes and procedures of putting together all subsystems or modules to form a single functional system

Using the same assembly procedure helps to ensure that each satellite has the same finishing quality. Also, same test procedure and conditions are used.

Proper documentation assures that no process or procedure is left out, and even with this, it is very easy to omit very important steps.



Simultaneous Assembly and Integration by BIRDS Team members



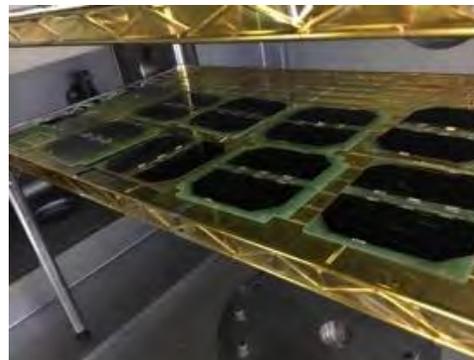
Adding RTV and Dotite to PCB



Vacuumping to remove air



Attaching Solar Cell

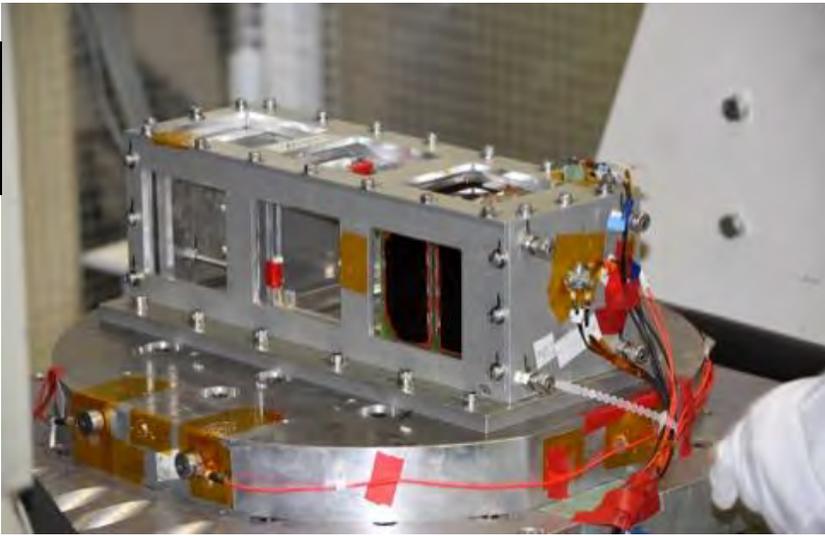


Vacuum testing of Solar Panels (Cells)

The assembled solar panels are exposed to high vacuum to demonstrate that the attachment process is adequate for the space environment.

In order to build identical satellites, the structure, bus system, integration and testing procedures must be same.

**GhanaSat-1  
Vibration  
Test setup**



# Vibration Test Setup

Vibration testing serves three chief purposes:

1. To ensure that the test article (satellite) is properly assembled. Important steps such as applying specified torque to a fastener may be omitted by the assembly personnel due to fatigue, vibration testing will reveal such omissions.
2. To guarantee that the test article can withstand applied loads. The performance of the satellite after vibration should not be degraded compared to its performance before vibration.
3. To satisfy safety concerns of the launch provider. In the event that a satellite can not withstand certain loads impacted by the launch vehicle, the satellite may break up and this may lead to a catastrophic chain of occurrences that may jeopardize the launch vehicle.



Setting Torque Marks



Removing Fasteners



Checking Amplifier Settings



Double Checking Test Setup

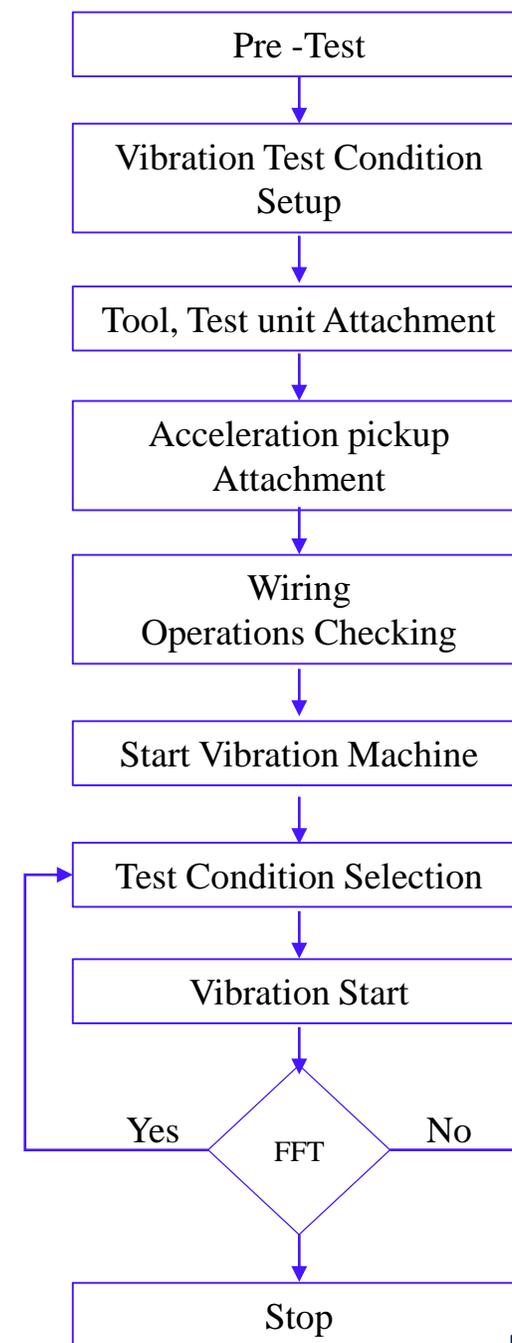
The vibration test setup refers to settings of test hardware - jig, torque, data acquisition accelerometers, amplifiers - and software (the vibration machine controller, and data collection interface software) as per the Vibration test plan.

# Vibration Testing Facility at Kyutech



Vibration Testing Machine, Center for Nanosatellite Testing, Kyutech

No.	Items	Specification		
1	Type	F-35000BD/LA36AP(made by EMIC)		
2	Exciting Force	Sine	35.0kN	
		Random	28.0kN	
		Shock	87.5kN	
3	No-load maximum acceleration	Vertical	Sine	1060.0 m/s <sup>2</sup>
			Shock	1470.0 m/s <sup>2</sup> (0-p)
		Horizontal	Sine	460.5m/s <sup>2</sup>
			Shock	1151.3 m/s <sup>2</sup> (0-p)
4	Maximum loading mass	Vertical	400kg	
		Horizontal	500kg	
5	Horizontal vibration table size	50cm x 50 cm		
6	Power	49.0kVA		



# 15. Completion of the BIRDS flight models – press conference held at Kyutech in the AM



A major press conference took place at Kyutech in the morning of 8 Feb 2017 to announce the completion of the BIRDS-1 flight models.

Taiwo, BIRDS-1 project manager, standing, makes a few points about the project



Representatives of Nigeria, Ghana, Bangladesh, and Mongolia



All major news outlets of the Kitakyushu Area attended this press conference



Representative of Mongolia makes a comment in Nihongo.





The BIRDS-1 Project Team – staff and students – at the end of the press conference



The press conference moved to the BIRDS Clean Room, where the flight models were kept. On the next day, these five flight models were hand delivered to JAXA (Tsukuba) by five BIRDS-1 students. They traveled via Shinkansen.



**Above:** simple luncheon (after the morning press conference) where students, staff, and guests, mingled and socialized.



**Right:**

Screen shot from a TV. Local station FBS broadcasted a story about the press conference in the evening of 8 February. NHK broadcasted a story too – it was much longer than the FBS story.

## 16. In the PM, a press conference was held for the benefit of the media in Bangladesh



Dr Werner Balogh  
(UNOOSA)

Prof Cho  
(Kyutech)

President  
(Kyutech)

Vice Chancellor  
(BRAC Univ.)

Prof Rhaman  
(BRAC Univ.)

**Continued  
on the  
next  
four pages.**

পাকিস্তানই শুধু এর মালিক। আগামী মার্চে বাংলাদেশের কৃত্রিম উপগ্রহটি আন্তর্জাতিক মহাকাশ কেন্দ্রের সঙ্গে যুক্ত হবে। মে থেকে তা মহাকাশে ঘুরে বেড়াবে। উপগ্রহটির ওজন প্রায় এক কেজি।



ব্র্যাক বিশ্ববিদ্যালয় থেকে পাস করা এবং বর্তমানে জাপানের কিউশু ইনস্টিটিউট অব টেকনোলজিতে (কিউটেক) গবেষণারত বাংলাদেশি তিন শিক্ষার্থীর তৈরি এই উপগ্রহ মহাকাশে উৎক্ষেপণের জন্য জাপান অ্যারোস্পেস এক্সপ্লোরেশন এজেন্সির (জেএএক্সএ) কাছে গতকাল

The clipping above is taken from “প্রথম আলো (Prothom Alo)”, the leading Bangla newspaper in Bangladesh. The caption reads, “Three graduates from BRAC University created this satellite and handed it over to JAXA yesterday.” The title of the news is, “Country’s First Nano-Satellite is ready.” The newspaper article explains some of the key points of Bangladesh’s first indigenously built satellite.



The article at the left-side of this PowerPoint slide comes the newspaper shown above. You can see that this newspaper is discussing BIRDS-1 satellite in thorough detail.

**The Bangladesh press conference was conducted as a 3-party Skype call (with no connection issues).**



The contingent at the Bangladesh side was large: officials of BRAC University, SPARRSO, BTRC, and more.



Participating from the University of Texas (El Paso) was Dr. Khan – who was formerly with Kyutech.

# Facebook Live

About one week after the Bangladesh Press Conference of 8<sup>th</sup> February, Maisun/Kafi/Antara conducted a “**Facebook Live**” broadcast because of the huge amount of interest generated by the 8<sup>th</sup> Feb event. They are shown at the right -- in the “just for the occasion” studio. For 3.5 hours, they fielded questions via the Internet. See the next page for a sample of comments received.



Here are the relevant links – check them out:

## PART 1 :

<https://www.facebook.com/BRACONNESHA/videos/892236514246810/?fallback=1>

## PART 2 :

<https://www.facebook.com/BRACONNESHA/videos/892283554242106/?fallback=1>

# Some of the comments received

This is “Outreach” on a grand scale



**Guna Surendra** · 1:12:15 Do you have any plans to develop a satellite back in Bangladesh?? This would be a great step and would also motivate students to work in space.  
Like · Reply · Message · 16 February at 01:46

**Raj Shekhor Roy** · 1:08:14 Is there any special reason reason for it to be green as to me white would have caused it to absorb less heat and hence less problem of thermal expansion . 😊  
Like · Reply · Message · 16 February at 01:42

**Masrur Khan Annan** · 30:08 #Satellite\_damage A Satellite can get damaged in many ways e.g. space Debris. How can a satellite with physical damage be repaired while its in orbit? Will the damaged satellite still be operational or will it malfunction?  
Like · Reply · Message · 2 · 16 February at 01:04

**Sadman Hoque** · 29:37 maybe already explained; but how does the high atmosphere conditions effect the signal transmission and receiving?  
Like · Reply · Message · 1 · 16 February at 01:03

**Miftah Mahmood** · 1:20:25 Vaia, advice for graduates who want to pursue their career on your fields? Like where should they apply and how?  
Like · Reply · Message · 1 · 16 February at 01:54

# BIRDS-1 satellites are delivered to JAXA

*Photo report (next 4 pages) by*

Turo (Mongolia rep)

Nakamura (Japan rep)

Ibukun (Nigeria rep)

Joseph (Ghana rep)

Kafi (Bangladesh rep)

Date: **9 February 2017** (the day that JAXA was visited by the aforementioned five)

The team sets off to JAXA at 5:00 AM on 9 February to deliver their homeland's first satellite.

On the floor are Pelican boxes protecting the 5 flight models from damage enroute to Tsukuba; we travelled by Shinkansen.





The team in a pose with JAXA H2 mock-up rocket



Tsukuba Space Center  
(photo from the Web)

The Kyutech team dining at JAXA cafeteria after a long day of work at the JAXA clean room.

**The work:** satellite inspections and insertion of BIRDS satellites into the J-SSOD (launch pod).



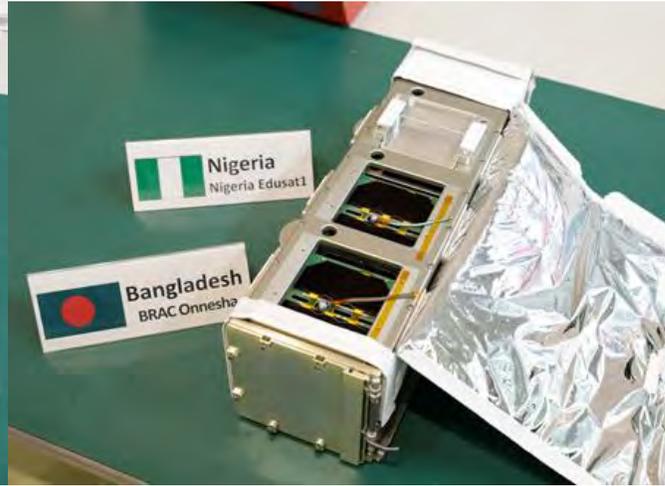
# Our hotel in Tokyo and getting about there



# 18. BIRDS at Tsukuba: Photos provided by JAXA



©JAXA



©JAXA

The two long white cases are J-SSOD pods. As you can see, three BIRDS-1 cubesats go into one pod, and the other two BIRDS-1 cubesats go into the other pod. The J-SSOD is lifted to the ISS in a rocket.



©JAXA



©JAXA



Nakamura-Joseph-Turo-Kafi-Ibukun

©JAXA



## 19. Lessons learnt by BIRDS-1 – transmitted to BIRDS-2 members



On Valentine’s Day of 2017, from 13:00 to 17:00, we all gathered to discuss the lessons learnt by the members of the BIRDS-1 team. This is extremely useful information for the BIRDS-2 team, which just started with their BIRDS-2 project. An excellent discussion occurred. Each BIRDS-1 member gave an oral presentation.



Student Ibukun (Nigeria) hammers home his points.



Student Erka (Mongolia) says, “And be sure you separate . . . .”

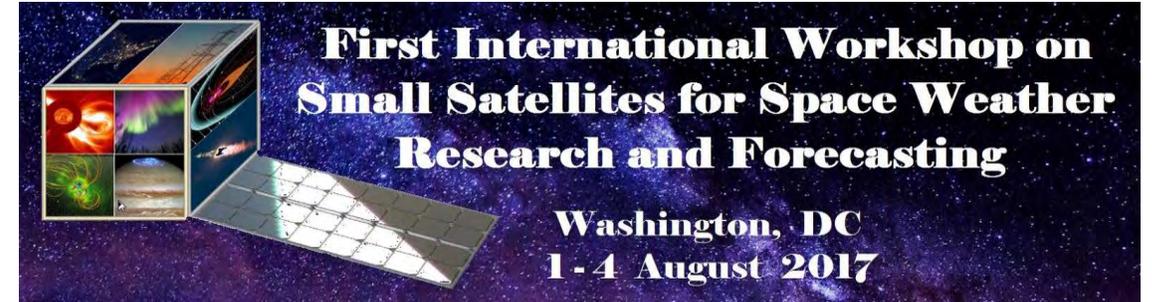
## 20. General announcement: First International Workshop on Smallsats for Space Weather Research and Forecasting (SSWRF)

This is just an example of how CubeSats can be used for science; this is not a recommendation of attendance. If you are interested, please apply directly.

### SECOND ANNOUNCEMENT AND CALL FOR ABSTRACTS

We invite you to take part in the **First International Workshop on Smallsats for Space Weather Research and Forecasting (SSWRF)**. The event will be held at The Catholic University of America in Washington, DC on 1-4 August 2017.

The **electronic abstract submission** is now open; the submission is free. Submit your abstract at <http://sswrf.cua.edu/abstracts.cfm> until 1 May 2017.



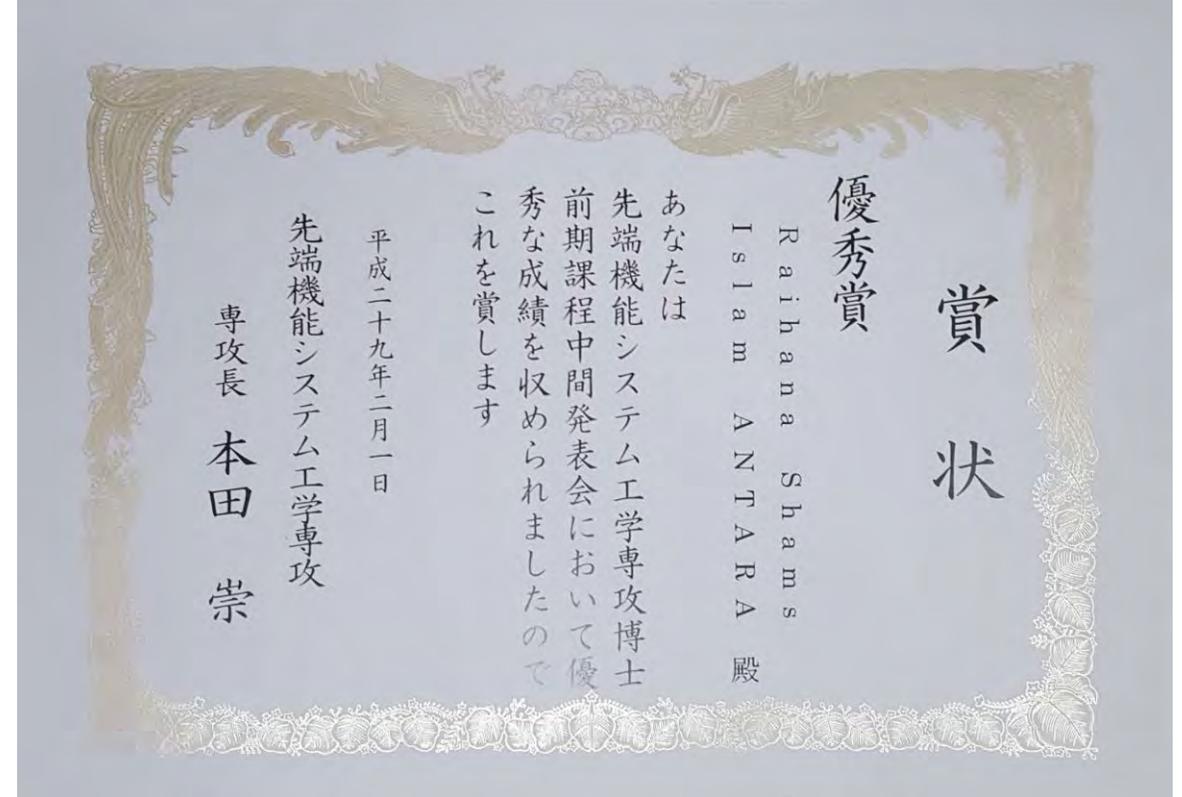
#### MEETING SCOPE

SSWRF is the first dedicated scientific meeting focusing on specific needs of space weather studies using small space-based platforms, including those utilizing the CubeSat reference design. The four major themes are **Research & Forecasting**, **Mission Concepts**, **Innovation & Technology**, and **Future Opportunities**. The workshop encourages a broad scope of contributions related to the application of small satellites to space weather observations, research, analyses, forecasting, and operations, including: **(1)** Small satellite observations relevant to space weather of interplanetary, solar, and geospace phenomena; **(2)** Investigations of space weather effects on small satellites: degraded capabilities, situational awareness, and satellite-debris collisions; **(3)** Using small satellite data in global space weather simulation and forecasting frameworks; and **(4)** General contributions relevant to the topic.

## 21. Antara receives award for outstanding mid-term presentation from Prof. Honda



The award ceremony was on 01 February 2017.



The award is signed and is presented by Prof. Honda of Kyutech.

**Good job,  
Antara !**

- G. Maeda

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