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BIRDS Project Newsletter

Issue No. 33
(18 October 2018)

Edited by:
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Kitakyushu, Japan

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

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All back issues of this newsletter can be easily downloaded.
Go to here: [http://birds1.birds-project.com/newsletter.html](http://birds1.birds-project.com/newsletter.html) and scroll down to the desired issue.
01. Tutors (for incoming overseas students) received a training session

On 18 Sept. 2018 in Room C-1C (Tobata Campus classroom) from 13:30 to 14:00, a training session was conducted for the tutors of the School of Engineering. These tutors will assist incoming students from overseas.
On 19 Sept 2018, Dulani (BIRDS-3, Sri Lanka) and G. Maeda visited ICSWSE (for the full name in Japanese and English see wall board at the far left) at 4:00 PM. The topic of discussion was about calibrating the magnetometer used by the BIRDS-3 final design. Dulani needed some expert advice of ICSWSE research staff. She learned some important things in this one-hour meeting.

THANK YOU STAFF OF ICSWSE FOR YOUR WISE ADVICE

A. Dr Uozumi
B. Dr Abe

Both are members of the technical staff of ICSWSE. Thanks also to Dr Yoshikawa, who is not shown here.

Brief presentation by Dulani
2018 Kyutech Open Camp (Tobata) occurred during 3 and 4 August. It was written up in the BIRDS Project Newsletter (see Issue No. 31, pages 42 – 44).

On the next six pages, you can find the write-up of the same event by “Kyutech Journal” No. 896.
This is what you see as you enter the Tobata Campus from the main gate (north side of the campus)
A new department was born this fiscal year: “Department of Space Systems Engineering” … it was introduced to Open Campus visitors (future students)
開催報告

学科紹介（電気電子）

電気電子工学科

あなたのご期待通りに、100%の展開を目指し、学生たちの研究活動をサポートしています。

電気エネルギーの発生・制御・応用、超電導、融解エネルギー、人工知能など、実用的で効果的な研究を進めてまいります。

応用化学科

化学の面白さを体験してもらうために、様々な研究実験やゼミの講義を通じて、学生たちが進化を遂げています。

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ラボツアー（応用化学）

大学の体験授業（応用化学）

マテリアル工学科

ポット溶接機での溶接デモ、CADによる光学石の結晶構造の投影などを見て、盛り上がっていた。学科の特色を具体的に示し、それに沿って各種のデモや体験で、すべてのデモや体験ができるように仕掛けになっており、さらに沿って各種のデモや体験で、社会や実生活との関連がわかるように工夫されていました。

女子カフェ

各種の女子学生が高校生の相談にのっており、2日間で15名の女子高校生の参加がありました。女子高校生の参加がありました。女子高校生の相談にのっており、2日間で15名の女子高校生の参加がありました。女子高校生の相談にのっており、2日間で15名の女子高校生の参加がありました。
開催報告

もともに、懇切丁寧に質問に答えている

学生がも和やかな雰囲気で

工学部ではスタンプラリーも開催された。3つのスタンプとアンケートを提出すると記念品がもらえるイベントもやっていました。学生達もスタンプラリーを楽しんでいたようで、暑さの中、オープンキャンパスは大盛況に終わりました。

情報工学部

平成30年7月14日（土曜）と15日（日曜）に九州工業大学情報工学部（飯塚キャンパス）において、平成30年度オープンキャンパスが開催されました。当日は、オープンキャンパスが運行され、多くの高校生が来場したが、高校生が1,145人、昨年度よりも多く、昨年度は56人でした。
End of the Kyutech Journal article about 2018 Open Campus at Kyutech.
04. Kyutech Fall Commencement Ceremony for Graduate Students .... 21 Sept. 2018

Kyutech President Y. Oie delivers address (in English)

Very international (13 countries)

Joven (Philippines) and Azami (Malaysia) – both BIRDS-2

Cont’d next page
Dean Serikawa with the graduates

Azami receives diploma from Dean Serikawa

CLASS of 2018
In the October 2018 issue of “CQ Ham Radio” [published in Japan], there is an article about BIRDS-2 and its recent deployment from the ISS. See the next page for that article.

Thanks to BIRDS-2 member Mr. Nakayama (Kyutech student) for providing this article.

You can buy the issue from Amazon for about 1000 yen
https://www.amazon.co.jp/CQ-ham-radio-2018年10月号/dp/B07G1WXT1N
衛星通信情報

DLSW-Bの一部は提供されている。人工衛星についての技術的な情報が含まれています。

BIRDS-2 ISSから放送される

BIRDS-2の launches BRAIA-1, MAYA-1, UMTSAT-1は、8月10日に衛星通信ネットワーク（ISS）から放送され、頻繁に更新されます。

1番目の発信者がBIRDSのCCNの一部を含んでおり、ISSの軌道を確認できます。衛星を確認するたびに、ISSからの情報を更新することで、結果を検証するための手段を提供します。

実際BIRDSの信号はYouTube チャンネル、ISSの追跡の情報は、衛星通信の航空機の位置をコンピュータに送信します。衛星の軌道を確認するための手段を提供します。

2番目の発信者がBIRDSのCCNの一部を含んでおり、ISSの軌道を確認できます。衛星を確認するたびに、ISSからの情報を更新することで、結果を検証するための手段を提供します。

3番目の発信者がBIRDSのCCNの一部を含んでおり、ISSの軌道を確認できます。衛星を確認するたびに、ISSからの情報を更新することで、結果を検証するための手段を提供します。

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06. Welcome new SEIC students (Kyutech entrance ceremony)

![Kyutech Entrance Ceremony](image)

This photo taken on 01 Oct. 2018 by Ms. Miwa Makino

**New SEIC students**

There are 5 Master course students and 7 Doctor course students.

- Hoda Awny A. A. ELMEGHARBEL (Master)
- Hari Ram SHRESTHA (Master)
- Hind MOHMOUD ELHAJ MOHAMMED (Master)
- Senior SHIMHANDA (Master)
- Timothy Ivan LEONG (Master)
- Lakhdar LIMAM (Doctor)
- Yasir Mohamed Osman ABBAS (Doctor)
- Izrael Zenar Casople BAUTISTA (Doctor)
- Marloun Pelayo SEJERA (Doctor)
- Mustapha Femi ISHOLA (Doctor)
- Mark Angelo Cabrera PURIO (Doctor)
- Yigit Cay (from Master to Doctor)
To all SEIC students:

Welcome to Space Engineering International Course (SEIC)!

On behalf of Kyutech staff, I convey our fervent hopes that you will enjoy a rich experience here at Kyutech. I hope you will learn a lot, experience amazing things, and make friends for life.

Upon completion of SEIC, I hope you will use the world as your stage to make contributions as a researcher or as a "high-performance" engineer. I hope you will successfully promote space in your home countries in terms of education and industrialization.

And I hope you can make many bridges between Japan and your homeland -- using the skills and human contacts that you acquired during your years at Kyutech.

The staff of Kyutech will work tirelessly on your behalf -- and we will endeavor to show you that your decision to study at Kyutech was the right decision.

Kazuyo SAKAGUCHI
Graduate School Office, College of Engineering
28 September 2018
08. Staying in touch with the global space industry: Attending IAC in Bremen, Germany

Some staff and students of Kyutech attended UN/IAF workshop and the IAC in Bremen

Dinner meeting with Prof. Cho, Dr Danielle Wood (MIT) and Dr Javier Stober (MIT—rocket propulsion expert) in front of main IAC entrance.

Per the table below, the workshop occupied the first three days. The next five days were for IAC.

<table>
<thead>
<tr>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
<th>Monday</th>
<th>Tuesday</th>
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<td>IAF workshop</td>
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<td>Day 1</td>
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<td>Day 1</td>
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<td>Day 3</td>
<td>Day 4</td>
<td>Day 5</td>
</tr>
</tbody>
</table>
Cheki’s talk during UN/IAF workshop

Cheki was invited to this UN/IAF workshop, and talked about Bhutan and space.

Dr. Jorge Kurita (director of Paraguayan Space Agency) and Cheki during a coffee break.
IAC presentation by Adrian of BIRDS-2
“Kyutech Night” was held at Bremen’s 600-year-old restaurant, “Ratskeller”
Many productive meetings occurred during the Bremen IAC . . .
IAC Student Reports

on the next three pages with photos

[in the order submitted]

All received on 15 Oct. 2018
My First IAC Experience in the “City of Space”  by Adrian Salces (BIRDS-2)

Inspired by this year’s theme #InvolvingEveryone, the International Astronautical Congress 2018 has brought more than 6000 people in the global space community in Bremen, dubbed as the “City of Space”. I had the great privilege of participating in the largest space event in the world to present our work on BIRDS-2 Project’s S&F Mission but I experienced much more than that! As a first-timer, it was exciting to “see” and “hear” about the various work and issues that people, organizations and companies are doing in their respective fields. One general observation I had is that participants from almost everywhere in the world utilize space to deal with distinct and common issues – be it economic, political, technological or driven by humanity’s innate desire for “future exploration” – but regardless of the motivation, everyone had a platform to share!

Indeed, IAC2018 serves as a learning experience that is beneficial to my career as a space engineer. Aside from witnessing wonderful presentations, panel discussions, exhibits and even performances, I met old and new friends who I can collaborate with in future endeavors. Overall, IAC2018 was inspiring, knowledge-enriching, and a great venue for sharing experiences and meeting with people!
My Thoughts on IAC 2018 - Cheki (BIRDS-2)

IAC : International Astronautical Congress
Venue: Bremen, Germany
Date : 1 – 5 October 2018

This was my first time to attend IAC, which is an annual event. It is one of the largest conferences on space with more than 6,000 participants from around the globe. The participants are not just technical people involved in space but rather consists of lawyers, entrepreneurs, musicians and so on. It is good opportunity to meet many people at one place.

To mention two highlights of IAC2018: 1) Plenary event on “Gravitational Wave Astronomy: Sounds from the Dark Side of the Universe.” As predicted by Einstein, a gravitational waves, created when 2 Black Holes merge, was detected on ground in 2015. A paper was published on it. Who were authors of the paper? 1,004 authors for one paper!

2) Listening to astronauts talk. Seven real life astronauts from different countries took a stage to share their ideas. Even the current commander of ISS joined live from space to answer few questions.

Advice: There are many parallel sessions. Plan well before hand so as to not miss any session of your interest.

Repetitive quote at the IAC 2018: Competition is driver. Cooperation is enabler.
It was a great experience to attend IAC2018 in Bremen, Germany. I met and talked with many professionals including professors, researchers, also students that has interest of space science and technology. We gathered and shared the knowledge with each other. I also had the chance to present my research about ionosphere observation in front of so many people, which was an exciting experience! I got feedbacks from the audience that may improve the research as well.

But the things that even more exciting were the lectures and talks that I attended during IAC2018. There were many people talking about going back to the Moon and build a moon base over there. Many also talked about exploration to farther outer space, with Mars as the first step. Listening to all these lectures, not only it broaden my knowledge but also gave me the positive energy to keep pursuing the dream, even though it may sounds too impossible for the others.

I remember in one of the presentations that I attended, the presenter said in the last slide: the process of pursuing something is to get fascinated, then inspired, and motivated. With my background as a student from a developing country, IAC2018 left me a great impression and motivated me to do more especially in space technology. Overall, I encourage another student to gain experience as much as possible that will also support our future career as well.

- Rahmi (SPATIUM)
The next IAC is in Washington, DC:

https://www.iac2019.org/

21-25 October 2019
09. SEIC Orientation – general explanations to the incoming batch of new SEIC students

During 10:30 am through Noon of 10th October 2018, SEIC Orientation was done for the incoming SEIC students.

Prof. Cho delivers a welcome address.
Ms. Makino explains course registration and other SEIC matters.
10. INVITATION TO ALL BIRDS GRADUATES: We welcome your news as articles

This is a request from the PI of the BIRDS Project (Prof. Mengu Cho) and from the Editor of the BIRDS Project Newsletter (George Maeda)

The graduates of BIRDS-1 and BIRDS-2 are cordially invited to submit articles to this newsletter as information to all members of the BIRDS community – which is quite large now. Tell us what you are doing. Or show us local media reports that are related to BIRDS or to yourself. If it might interest the entire BIRDS community, please send it in for publication in this newsletter. Share your news, experiences, accomplishments, and technical developments. We are deeply curious.

Format details:

- Use PowerPoint
- Use a good mix of text and graphics, photos, etc.; text only is deadly dull
- Keep it interesting and entertaining
- Write your name and affiliation, and date of completion
- Keep the bottom 1.5 cm clear for newsletter footers [you can see them below]
- Dead line is the 15th of each month, for that month
Objective

To prevent unwanted damage/accident on the antenna of BIRDS ground station, especially during typhoon/strong wind
Precautions for Satellite Operation

• Before operation:
  • Double check the **weather forecast** and **wind’s speed sensor** (<10)

• After operation:
  • Ensure the **antenna position** at **0 degree** for both azimuth and elevation
  • Make an operation report and notify weather forecast for tomorrow

If there is a warning (i.e. typhoon or strong wind)

I. Immediately set the antenna position auto/manually using the controller to
   a. **Elevation** of **90 degree**
   b. **Azimuth** of **0 degree**  Refer to the picture in the next page!

II. Suspend the operation until the weather is OK

III. Check the antenna at the roof top after the incident

Reference Pictures

Antenna rotator controller

BIRDS GS UHF/VHF Antenna (at Kyutech)
12. A report from UiTM in Malaysia

STEM ACTIVITIES at UiTMSAT

Prepared by: Siti Amalina Enche Ab Rahim & Siti Nadhirah Mohamad Rahim  
Research Coordinator & Postgraduate student  
Center for Satellite Communication  
Faculty of Electrical Engineering, Universiti Teknologi MARA (UiTM)  
15.October.2018
STEM@UiTM Carnival was held at Menara Kejuruteraan Tuan K. A. H. Muadzam Shah, UiTM Shah Alam, Selangor, Malaysia from 8:00 am to 5:00 pm.

STEM is an abbreviation for Science, Technology, Engineering and Mathematics.

Center for Satellite Communication (UiTMSAT), Faculty of Electrical Engineering was selected to participate in this program and to provide STEM activities.

Students from upper primary school and secondary school from 500 different schools came to visit the UiTMSAT and participated in an interactive game conducted.

Prepared by: Siti Amalina Enche Ab Rahim & Siti Nadhirah Mohamad Rahim
Research Coordinator & Postgraduate student
Center for Satellite Communication
Faculty of Electrical Engineering, Universiti Teknologi MARA (UiTM)
16.October.2018
During the event, UiTMSAT1 received a visit from The Honorable Teo Nie Ching, Deputy Minister of Education, Malaysia, accompanied by the top managements of UiTM.
Interactive game and activities during STEM@UiTM:

1. All about aurora.
2. Journey to Antartic and experiment conducted by Dr. Huzaimy and team members.
3. Demonstration on the antenna’s deployment of BIRDS-2 nanosatellite, and how a satellite can orbit the Earth.
4. Quizzes using Kahoot.
Center for Satellite Communication (UiTMSAT), Faculty of Electrical Engineering received a visit from MARA-JAPAN Industrial Institute (MJII). The purpose of this visit is to gain knowledge on BIRDS-2 nanosatellites, to take a look on the facilities, especially the satellite ground station, and to foster collaboration between MJII and UiTMSAT.

Assoc. Prof. Ir. Dr. Mohamad Huzaimy Jusoh presented about UiTMSAT to the visitors.
Center for Satellite Communication (UiTMSAT), Faculty of Electrical Engineering received an invitation from Petrosains to open a booth at Petrosains Science Festival 2018. This festival took place at Suria KLCC, Kuala Lumpur.

UiTMSAT-1 featured in the Petrosains Science Festival 2018’s booklet.
The venue: Suria KLCC, Kuala Lumpur
Aurora borealis
Deployable antenna mechanism
How satellite orbits the Earth
Reading the Morse code

STEM activities @ UiTMSAT’s booth during Petrosains Science Festival
The festival was held for 3 days (14-16 September 2018). Our booth received many visitors who were interested with UiTMSAT-1 and BIRDS projects.
Children were curious about how satellite can orbit the earth.

The visitors were interested with UiTMSAT-1 and BIRDS project.

Full house!
Assoc. Prof. Ir. Dr. Mohamad Huzaimy Jusoh was invited as a speaker during the festival. He delivered his talk on UiTMSAT-1 and BIRDS-2 project on 15 September 2018.
13. BIRDS-2 CW Decoding Competition

• A competition among BIRDS GS network
• Competition period: August 24 – September 24, 2018
• 5 Ground Stations actively participated:
  • BRAC, Bangladesh
  • DITT, Bhutan
  • UiTM, Malaysia
  • UPD, Philippines
  • NCKU, Taiwan
• The Competition continues for another month: October 1-31, 2018.
• **Winner for first month: UiTM GS, Malaysia**
14. BIRDS-3: Monthly activities report

BIRDS-3
Sept-Oct 2018
Monthly Report
by
Abhas
(BIRDS-3 Project Manager)
BIRDS-3 Activities on Sept-Oct 2018 (Abhas)

- BIRDS-3 Weekly Meeting
- EM-2 Preparation
- Visitors from Malaysia to BIRDS room
- Kakimoto Preps for EM-2 OBC
- Makiko Prepares Dipole Antenna
- Anechoic Chamber Testing III

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BIRDS-3 September 2018 Potluck Dinner

Pao’s Thai Noodle Soup

Post-dinner

Hoda’s happy

Special guests

Maisun getting excited

BIRDS-3 girls
15. BIRDS-3: Magnetometer calibration at Sasaguri (Kyushu Univ. facility)

BIRDS-3
MAGNETOMETER CALIBRATION IN SASAGURI

by
Dulani Chamika and Yuta Kakimoto
13 October 2018
As BIRDS-3 needed to calibrate the magnetometer used in the satellite we visited Kyushu University Medicinal Botanical Garden in Sasaguri.

International Center for Space Weather Science and Education (ICSWSE), of Kyushu University owns a Helmholtz coil.

We visited this place on 25th of September. Professor Uozumi from Kyushu University ICSWSE joined to help us with the test.
The Test Location

In front of the main building/Prof Uozumi in the left

Small gate to enter to the lab

Helmholtz coil’s Lab

On the way to the lab

After entering from the small gate
Preparing for the test

Prof Uozumi before starting the test

Kakimoto checking the UART connection

Prof Uozumi controlling the Helmholtz coil
Specifications of the Helmholtz Coil

<table>
<thead>
<tr>
<th></th>
<th>X</th>
<th>Y</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inside Dimension</td>
<td>1290mm x 1290mm</td>
<td>1180mm x 1180mm</td>
<td>1400mm x 1400mm</td>
</tr>
<tr>
<td>Outside Dimension</td>
<td>1390mm x 1390 mm</td>
<td>1280mm x 1280mm</td>
<td>1500mm x 1500mm</td>
</tr>
<tr>
<td>Coil Space</td>
<td>723mm</td>
<td>661mm</td>
<td>781mm</td>
</tr>
<tr>
<td>Magnetic field</td>
<td>77010nT</td>
<td>83897nT</td>
<td>71459nT</td>
</tr>
<tr>
<td>Current</td>
<td>2.0A</td>
<td>2.0A</td>
<td>2.0A</td>
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</tbody>
</table>

According to Prof. Uozumi, uniform magnetic field can be generated at the center 20 cubic centimeters area. So we should set up our magnetometer within this 20 cubic centimeters area.
Test Set Up

From this room, the north is the X axis of the Helmholtz coil. If we set the magnetometer properly, in our magnetometer, Y and Z axis should get some negative value of earth magnetic field, and X axis should be almost 0. We installed the MSN board vertically by checking the spirit level.
## Testing Procedure

<table>
<thead>
<tr>
<th>No.</th>
<th>Operation</th>
</tr>
</thead>
</table>
| **Procedure 1**  
Initial value measurement | Checked the initial value of the magnetometer |
| **Procedure 2**  
Rough check for magnetometer working | 250mG and 500mG was given to X, Y, Z axis and checked the magnetometer readings. (The magnetometer readings had some dropping points) |
| **Procedure 3**  
Find the error of the magnetometer | To check the dropping points the Magnetic Field was gradually increased and decreased manually |
| **Procedure 4**  
Measurement after modifying the error | After modifying the program again the magnetic field was gradually increased and decreased manually to check the whether there are dropping points. |
| **Procedure 5**  
Measure the magnetic field value for the calibration of the Magnetometer | A magnetic field was generated for 60s and the switched off for 60s. The generated magnetic field was from 60000nT to -60000 nT (±20000nT, ±40000nT, ±60000nT). |
Correct the Magnetometer Error

At the procedure2 (Rough check for magnetometer working), we found some error of our magnetometer working, by gradually increase/decrease the generated magnetic field.

For each axis value, there is a large gap between $\pm 600$ mG. Before we start the calibration test, we needed to correct the error. Also, the value was very noisy, so we also added some function to remove the noise.
Correct the Magnetometer Error

After correct the gap error and noise problem, we checked the gradually increase/decrease the magnetic field again (test procedure 4).

As you can see from this result, the $\pm 600\text{mG}$ gap had been removed. Actually, some noise still there, but they are the tolerance for this test. Also, as mentioned on the previous page, X axis value is almost 0mG. Now we were ready to start the proper calibration test (procedure 5).
Test Results

The purpose of the test was to check the linearity between the measured magnetic field (from the magnetometer) and the calculated magnetic field (generated from the Helmholtz coil). According to the graphs measured magnetic field and the calculated magnetic field are linear.
Conclusion

• In this magnetometer test, we could get the linearity in the graph of the theoretical value and measured value.
• Currently, our magnetometer meets the requirements of satellite stabilization mission.
• As a future task, we will execute some test about whole ADCS system which includes this magnetometer, gyro sensor, GPS, and magnetorquer by using some test equipment in our laboratory.

We, the authors, wish to gratefully acknowledge the huge amount of assistance from Prof. Uozumi of Kyushu University.
Summary of recent news out of Nepal

by Hari Ram Shrestha
12 October 2018
“Launching of Nepal’s First Satellite in Nepalese Media”

On behalf of Government of Nepal, Nepal Academy of Science and Technology (NAST) and Kyushu Institute of Technology (Kyutech) Japan had signed the MOU to launch the first Nano-Satellite of Nepal in Space. Besides this, Kyushu Institute of Technology has been supporting NAST time and again both technically and academically in order to gain knowledge on Nano Satellite technologies. As this is the first time Nepal is launching its first Nano-satellite, various national and local medias such as televisions, newspapers, FM Radios, online portals, etc. are taking interest in covering up the news on BIRDS-3 project as well as Nepal's first Nano-Satellite. Curiosity on this topic amongst the youngsters, technical experts, students of Science and Technology is growing at a greater pace. Along with this, medias has been supporting to this project highlighting and publicizing this Birds-3 project as well as Nepal's first Nano-satellite. Dr. Buddhi Ratna Khadge, Secretary of NAST, in an interview quoted to establish a Ground Station along with Space Centre by this year with the cost of seed money of NPR. 2 crores for hardware and launching cost to Kyutech. Similarly, Dr. Rabindra Pd. Dhakal, Chief of Faculty of Technology, NAST, marked to provide opportunity for the Engineers and Space related students in the field of research, development of satellite in the home country as well as its application therein encouraging the youth. The former Vice-chancellor of NAST, Prof. Dr. Jiba Raj Pokharel has initiated this program and had been focusing on its importance and ultimately develops skilled manpower in Nepal. For this, Hari Ram Shrestha has been nominated from NAST to take a step forward and make a remarkable effort in the field of Nepal's first Nano-satellite.
Related Links are:

https://youtu.be/rFb2kQ4KSA from Kantipur Television
https://youtu.be/ar610QMLhA?t=1051(1:00 to 16:38) min ,from Nepal Television ,NAST Television Program
https://youtu.be/zpyOhaol2cE?t=305(1:00 min to 14: min) ,from Nepal Television ,NAST Television Program
https://youtu.be/fp7-ULFcDz0?t=3 from AP1, Television
https://setopati.com/from-paper/135758 from Setopati.com
https://youtu.be/jzVeVedPrds ( from Sagarmatha Television)
https://youtu.be/_iEZmK7Ycn8( News24 Television, time 6:30 to 9:07) min
https://www.youtube.com/watch?feature=share&v=i0AwXJYX8hs&app=desktop
http://www.nayapatrikadaily.com/2018/10/06/102483/
https://www.youtube.com/watch?v=hgshVkdJoso
Photos from different media
Dead line for abstracts is the end of October 2018

https://www.ists.or.jp/
End of this **BIRDS Project Newsletter**
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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.