Kibo Robot Programming Challenge, KiboCUBE, and More
- UNOOSA/JAXA Education Programs on the ISS “Kibo” -

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The ISS is a huge manned construction located about 400km above the Earth.

JAXA has contributed to the ISS program by developing and operating the Kibo module and HTV.

Japan is the only country participating in the ISS program in the Asia-Pacific region. JAXA has collaborated with many countries in the region.
APRSAF was established in 1993 to enhance space activities in the Asia-Pacific region. APRSAF is the largest space-related conference in the Asia-Pacific region with participation of over 40 countries.

Under the Space Frontier Working Group, the Kibo-ABC collaborative initiative was established in 2012 to promote “Kibo” utilization in the Asia-Pacific region and to share and build on the outcomes of “Kibo” utilization.

19 organizations from 14 countries and regions are implementing several programs as members of Kibo-ABC.
Goal and Activity of Kibo-ABC

Sharing the Benefits of ISS/Kibo

Goal

Step 1

Multilateral education programs among member agencies

➢ Education and capacity building (for space agencies and students)
➢ Understanding of space environment utilization

Step 2

Bilateral missions between JAXA and a member agency

➢ Bringing innovative ideas
➢ Creation of bilateral missions (new space experiment missions)
Kibo-ABC Multilateral Education Programs

Kibo Robot Programming Challenge program
- Programming competition for students to have interest in future space technology development

Asian Try Zero-G program
- Scientific experiment ideas is proposed by Asian youth. The ISS crew executes selected ideas.

Space Seeds for Asian Future program
- Small plant experiments on Kibo

• These programs are igniting the passion of the next generation in the Asia-Pacific region.
• They also engage and influence students to pursue careers in science and technology.
The Kibo-RPC is an educational program. **Students solve various problems by programming free-flying robots (Astrobee and Int-Ball) in the ISS.**

- Participants will have the chance to learn cutting-edge methodologies and hone their science, technology, engineering, and mathematics (STEM) skills.
- The Kibo-RPC expands international exchange by encouraging students to interact with other participants from around the world.
- The program also expands Kibo utilization in the Asia-Pacific region and the world.
- The Kibo-RPC has been conducted every year since 2020.
1,431 students on 351 teams from 17 countries and regions joined the 3rd Kibo-RPC.
Schedule of the 4th Kibo-RPC

2023

February    April    July    September

Call for Participation until 5/28

Preliminary Round using simulator

Program Refine

Final Round in ISS using real robot

Preliminary round is held by participating agencies.

Kibo-ABC members since 2020

NASA (USA) since 2022

UNOOSA (developing economies) since 2023

Cooperation framework:
APRSAF/Kibo-ABC

Japan-U.S. Open Platform Partnership Programs (JP-US OP3)

UNOOSA – JAXA Cooperation
Students have already started developing their programs for the Preliminary Round!

https://jaxa.krpc.jp/
You can get more information about Kibo utilization activities in the Asia-Pacific region on the website.


Search “KUOA JAXA” !
J-SSOD to deploy CubeSats from “Kibo”

Exposed Facility

Airlock

Pressurized Module

Robotic Arm

JEM Small Satellite Orbital Deployer (J-SSOD)
Capacity building through J-SSOD

JAXA launched comprehensive capacity-building measures to provide educational programs and sustainable satellite deployment opportunities, which contribute to the SDGs Goal 4, 8 and 9.

Partner: UNOOSA

Partner: UNISEC (University Space Engineering Consortium)

Kibo CUBE

- Program in collaboration with UNOOSA
- To provide 1U size CubeSat deployment opportunities for Access to Space for All

J-CUBE (Fee-Based)

- To provide more challenging satellite deployment opportunities for various countries in collaboration with Japanese universities

Kibo CUBE Academy (Online education program)

- To provide opportunities for educational aspects through satellite lifecycle
- Sustained international contribution by construction of relation in various countries and university in Japan

Partner: UNOOSA, Cooperation: UNISEC
KiboCUBE Academy

Free lectures are posted here!

https://www.unoosa.org/oosa/en/ourwork/access2space4all/SatDevTrack_Webinars.html#Tag1

Live sessions are also held a few times a year.
Advantages of KiboCUBE

1. Free of charge
2. A learner can get technical support from experts (UNISEC, JAXA, Service provider)
3. Launch opportunities: 3-4 times a year (even if you miss a certain flight, you don’t have to wait for a long time for the next chance)
4. Low vibration conditions during the launch compared to rocket rides
5. You can see the deployment in real time!
<table>
<thead>
<tr>
<th>Round / Winner</th>
<th>Objective / Status</th>
</tr>
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<tbody>
<tr>
<td><strong>1st</strong>&lt;br&gt;KENYA : “1KUNS-PF”&lt;br&gt;University of Nairobi</td>
<td>To monitor agriculture and coastal areas&lt;br&gt;Deployed : May 11, 2018</td>
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<td><strong>2nd</strong>&lt;br&gt;GUATEMALA : ”Quetzal-1”&lt;br&gt;Universidad de Valle De Guatemala</td>
<td>To acquire remote sensing data for natural resource management&lt;br&gt;Deployed : Apr. 29, 2020</td>
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<td><strong>3rd</strong>&lt;br&gt;MAURITIUS : “MIR-SAT 1”&lt;br&gt;Mauritius Research and Innovation Council</td>
<td>To collect images and to test onboard communication&lt;br&gt;Deployed : Jun. 22, 2021</td>
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<td><strong>3rd</strong>&lt;br&gt;INDONESIA : “SS-1”&lt;br&gt;Surya University</td>
<td>To demonstrate remote communication&lt;br&gt;Deployed : Jan.6, 2023</td>
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<td><strong>4th</strong>&lt;br&gt;MOLDOVA : ”TUMnanoSAT”&lt;br&gt;Technical University of Moldova</td>
<td>To demonstrate technology and test various components&lt;br&gt;Deployed : Aug. 12, 2022</td>
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| **5th**
SISTEMA DE LA INTEGRACIÓN CENTROAMERICANA (SICA): ”MORAZAN-SAT”
![SICA Logo](image)
| To monitor weather variables in remote areas providing early warning during extreme weather events
Under development |
| **6th**
MEXICO: ”Gxiba-1”
The Universidad Popular Autónoma del Estado de Puebla
![Mexico Flag](image)
| To observe active volcanoes in Mexico and analyze the ash dispersion
Under development |
| **6th**
TUNISIA: ”TUNSAT-1”
Ecole Supérieure Privée d’Ingénierie et de Technologie Appliquée
![Tunisia Flag](image)
| To validate the technology which is the focus on the reliability of 1U CubeSat
Under development |
| **7th**
No awardee
| N/A |
JAXA is eager to support capacity-building and technology development in collaboration with UNOOSA.

Kibo-ABC programs (such as Kibo-RPC) and the KiboCUBE program contribute to the sustainable development of space-related activities and human resource development worldwide.

The 4th Kibo-RPC is conducted in 2023, and the next Round of KiboCUBE is coming soon!