

# General overview of how to collaborate with a Japanese university for J-Cube



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# Introducing

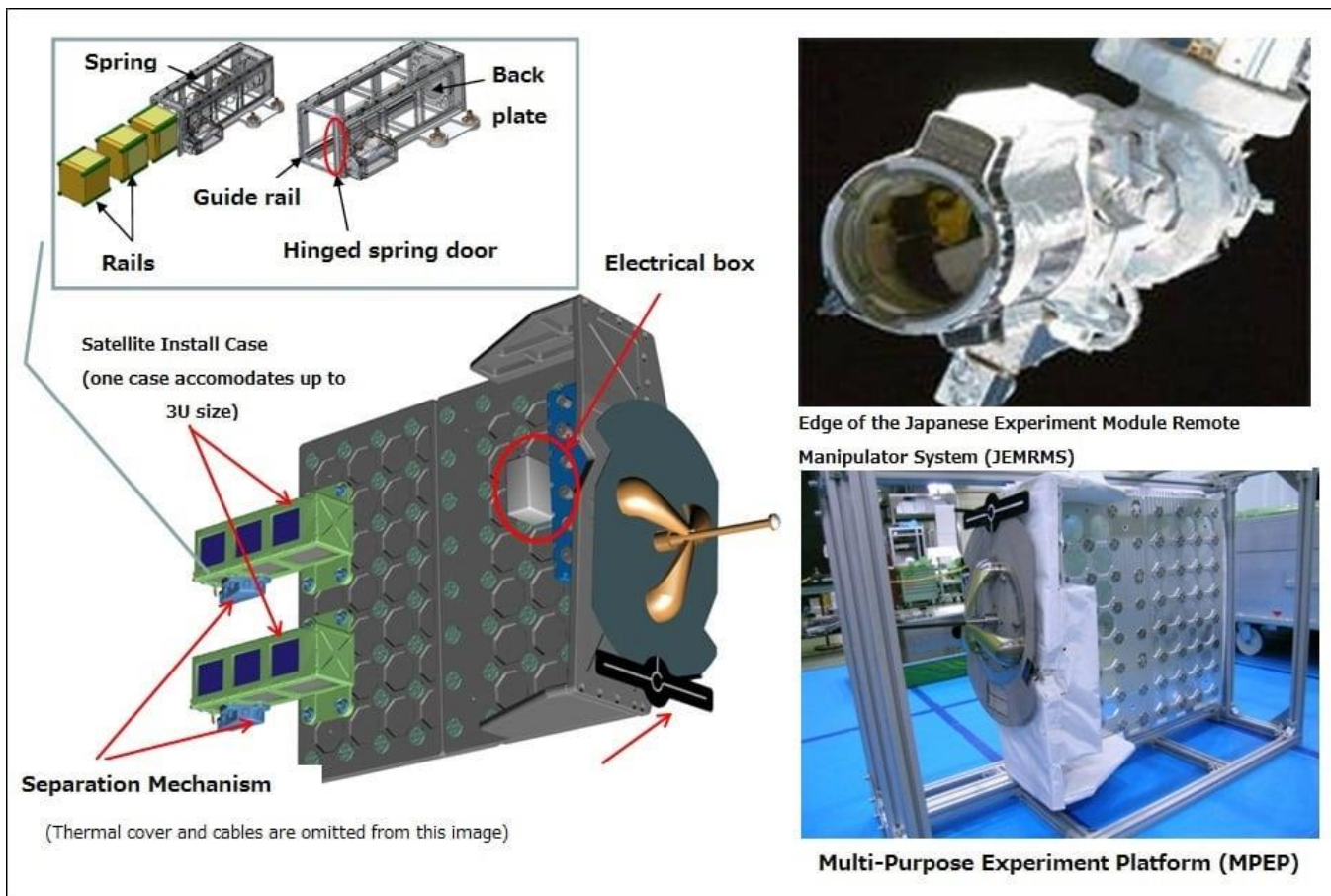
**J-CUBE**

**A new collaboration between JAXA and UNISEC to help emerging space nations get their first CubeSats deployed into Low-Earth Orbit via the ISS.**

**Your  
Future  
CubeSats**



**UNISEC**  
University Space Engineering Consortium



**JEM Small Satellite Orbital Deployer (J-SSOD)** is a mechanism for deploying small satellites. It is designed in accordance with CubeSat design specification (10cm × 10cm × 10cm). The satellites installed in J-SSOD is transferred from the Japanese Experiment Module Kibo's airlock to space and are released on orbit.

In order to respond the increased demands for the CubeSat deployments, a reusable satellite orbital deployer (JEM Small Satellite Orbital Deployer Re-usable: J-SSOD-R) has been introduced in March 2021, which accommodates the maximum 24U (6U per each deployer) capability.

## JEM Small Satellite Orbital Deployer (J-SSOD)

**FROM:** <https://humans-in-space.jaxa.jp/en/biz-lab/experiment/facility/ef/jssod/>

# *J-CUBE is not to be confused with KiboCUBE*

## JAXA+UNISEC, low-cost opportunities

The program has two categories:

- ① one is construction of international collaborative relationships,
- ② another is for domestic capacity building.

Both categories require Japanese partners (UNISEC-Japan's universities, institutes, and technical colleges) for small sat development.

J-CUBE winners secure a low-cost launch opportunity 12U/per year (or 6 satellites/per year). The satellite size is assumed to be 1~3U.

### **J-CUBE:**

<http://unisec.jp/serviceen/j-cube>

## JAXA+UNOOSA, zero-cost opportunities



### **KiboCUBE:**

[https://www.unoosa.org/oosa/en/ourwork/access2space4all/KiboCUBE/KiboCUBE\\_Index.html](https://www.unoosa.org/oosa/en/ourwork/access2space4all/KiboCUBE/KiboCUBE_Index.html)

# J-CUBE vs KiboCUBE

	J-CUBE	KiboCUBE
Launch price	Not free, but much lower than the market price	Free
Size	Up to 3U	1U
Selection	Application is reviewed by the selection committee	Very competitive
Requirement	<b>Team up with a Japanese university</b> Capacity building purpose	Capacity building purpose

*Would you like to know more about J-CUBE?*

**With J-CUBE you are more likely to secure a launch slot than with KiboCUBE, and at a cost far below commercial launch fees.**

**A series of *J-Cube events* are planned:**

**[1] J-CUBE webinar@UNIGLO Virtual  
MTG(8/19 22(JST)~)**

**[2] J-CUBE consulting for Japanese  
University about Safety Review**

**[3] J-CUBE Orientation@UNIGLO On Site  
MTG(1<sup>st</sup> Dec. 2023)**



# Kyushu Institute of Technology (Kyutech)

- A national university founded in 1909
  - 4,200 Undergraduate students
  - 1,300 Graduate students
  - 360 Faculty members
  - Engineering, Computer science, Life-science
- Located in the Kitakyushu region
  - Population of around 1million

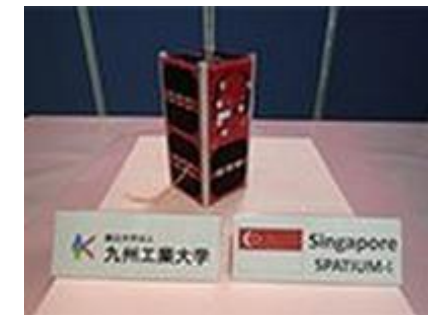
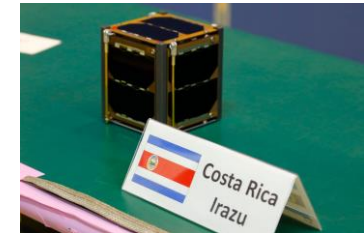




# Kyutech record of collaborating with foreign partners



No.	Country	Project
1	Singapore	Aoba-VELOX III
2	Ghana, Mongolia, Nigeria, Bangladesh	BIRDS-1
3	Costa Rica	Irazu
4	Bhutan, Malaysia, Philippine	BIRDS-2
5	Singapore	SPATIUM-I
6	Nepal, Sri Lanka	BIRDS-3
7	Singapore	Aoba-VELOX IV*
8	Vietnam	MicroDragon*
9	Egypt	NARSSCube-1
10	Paraguay, Philippine	BIRDS-4
11	Philippine	Maya-3, Maya-4
12	Zimbabwe, Uganda	BIRDS-5
13	Philippine	Maya-5, Maya-6
14	Mexico	K'oto
15	Thailand	KNACKSAT-2



Photos by JAXA

\*Epsilon rocket

To be launched

# Why do we work with foreign partners?



- Our mission (LaSEINE/Kyutech)
  - Contribute to the humanity by bringing diversity to the space sector
- Assisting new-comers entering to the space sector is our mission
- But not all the Japanese universities have the same mission
  - For each case of collaboration, benefits to Japanese universities need to be identified when you find a Japanese partner

# Typical flow

1. First contact
2. Meeting (remote/in-person)
3. Many remote meetings and many exchange of e-mails
4. Statement of Work (SoW)
  - What to do in the collaboration
  - Responsibilities of each party
5. Contract signed
6. Money transfer
  - Usually from foreign partners to Japanese universities
7. Actual works
  - Students may come to Japan as full-time graduate students or research visiting students
8. Satellite launch and operation
9. Discussion on the next collaborative project

# Important points

- In-person meetings are important to know each other
  - Utilize conferences such as UNISEC-Global, IAC, etc.
- Clear definition of responsibilities in SoW
- Be careful about money transfer
  - Anticipate many dramas
- Continue the collaboration even after the project

# What Japanese universities want

- Universities are not launch brokers
  - Not doing for money
  - Expect return in other ways
    - Students, papers, etc.
- Leverage the international collaboration to promote globalization of university research/education and campus
- Japanese university may simply want to lower the launch cost by sharing with the foreign partners
- Anyway, note that you are not dealing with launch brokers



# Suggested schemes

- Good collaboration scheme
  - Joint development of CubeSat
    - Student exchange through the project
    - Students (both Japanese and non-Japanese) learn how to work with people from different cultural background
- Other good schemes
  - Satellite is built outside Japan, but students come to Japan for study
    - Learn satellite development/testing/operation via hands-on
    - Serve as a liaison with the home country
  - Satellite is built in Japan by students coming from abroad
    - Learn satellite development/testing/operation via hands-on



# Student exchange

- Suggest long-term ( $> 1$  year) stay
- Full-time graduate student is a good option
  - Japanese university tuition is much lower than other developed countries
- To enroll a graduate school in Japan, everybody needs to pass the exam.
- Be careful about the time-line
  - For October admission, the exam application period is May\*
  - To send students to Japan, the preparation must start in advance

\*Kyutech application period for Fall admission is May and Spring admission is October.  
The application period differs depending on universities

# Things to be noted

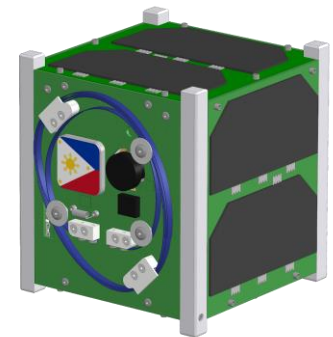
- As the money transfer occurs in J-CUBE, the contract between the foreign entity and the Japanese university is necessary
- The contract is legally-binding. Need assistance from the legal section of your organization
- The points in the contract
  - Non-military use
  - UN registration
  - Export control
  - Payment due
  - Payment currency (it is in Yen!)

# **J-Cube Projects currently ongoing**

# Maya-5 and Maya-6 Cube Satellites (Philippines university-consocium)

## Project Brief /Description

Maya-5 and Maya-6 are the second set of Philippine university-built CubeSats, developed by the second batch of STeP-UP scholars. The project aims to gain and locally extend the knowledge and skills on satellite development acquired from foreign schooling and utilize the domestic capabilities for satellite development.





Deployed to space from ISS on July 19, 2023



**Maya-5 and Maya-6**  
SUCCESSFULLY DEPLOYED TO SPACE!

Photo from Japan Aerospace Exploration Agency - JAXA live stream

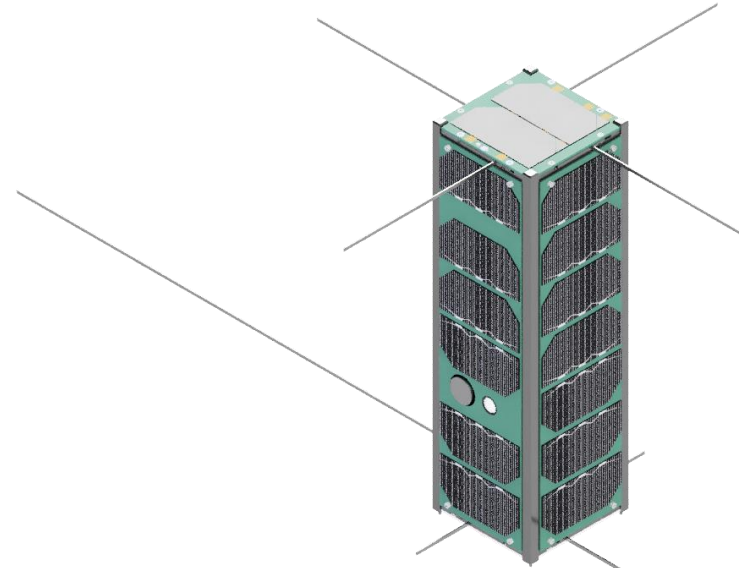
# KNACKSAT-2

## KMUTNB (Thai)

### Payload Rideshare Mission CubeSat

Satellite Bus System

Payload Area

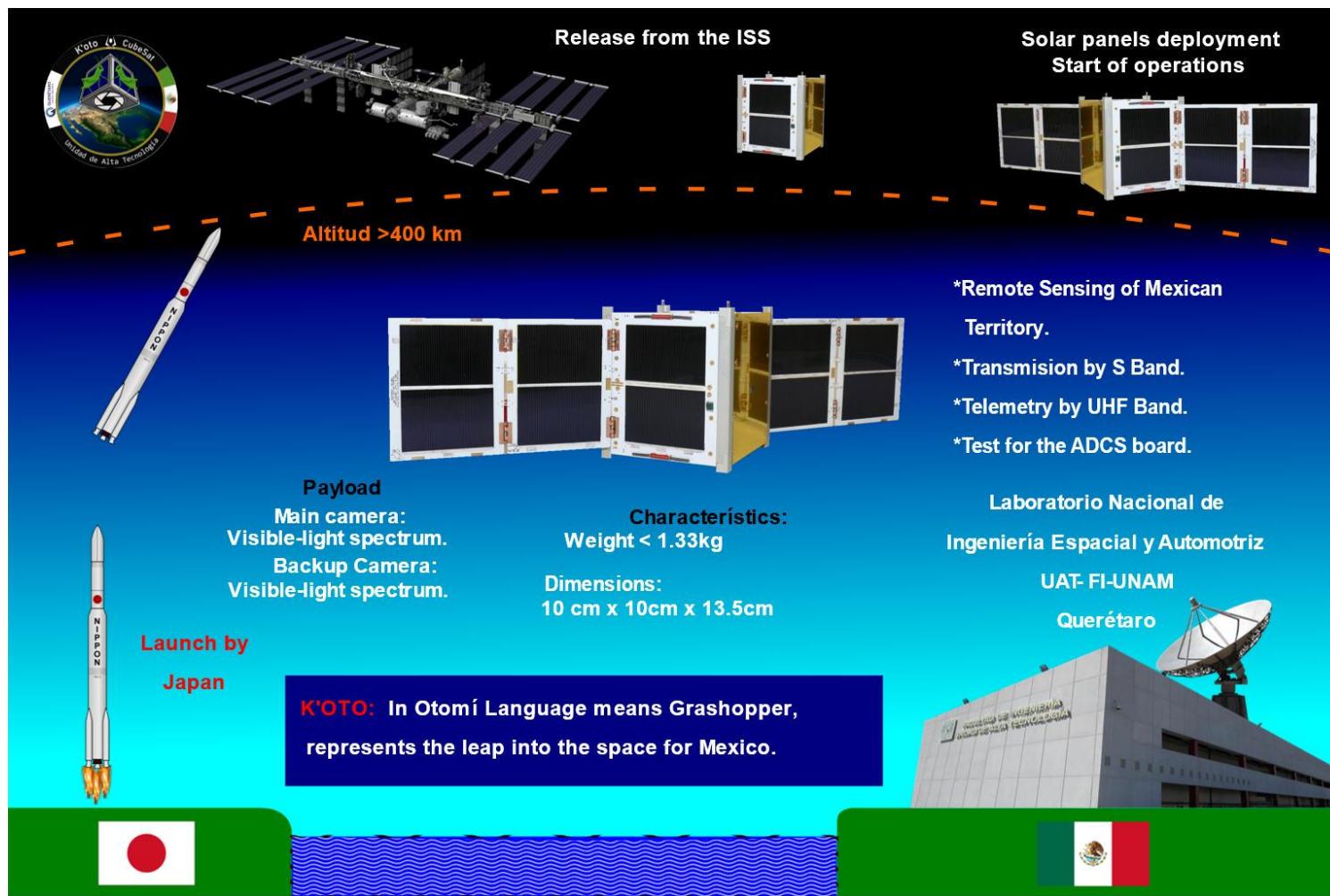


#### Satellite R&D Partners

- Thai-German Pre-Engineering School
- Advance Wireless Network (AWN) Co., Ltd. (AIS)
- National Astronomical Research Institute of Thailand (NARIT)
- Rail System Research Cluster KMUTNB
- Universiti Teknologi MARA (UiTM), Malaysia
- University of Perpetual Help, Philippines

# K'OTO UNAM(Mexico)

It is an initiative directed by academics and university students from the National Laboratory of Space and Automotive Engineering of the National Autonomous University of Mexico (UAT FI-UNAM), with the support of the Sustainable Development Secretariat (SEDESU) of the Queretaro State Government, to foster the space field in Mexico.





# ASEANSAT UiTM (Malaysia)

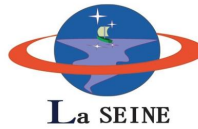
First ASEAN Collaboration (for South-East Asian Institution) Nanosatellite project



UNIVERSITY OF  
**PERPETUAL HELP**  
SYSTEM DALTA LAS PIÑAS CAMPUS  
www.perpetualdalta.edu.ph



**KMUTNB**



**Kyutech**  
Kyushu Institute of Technology



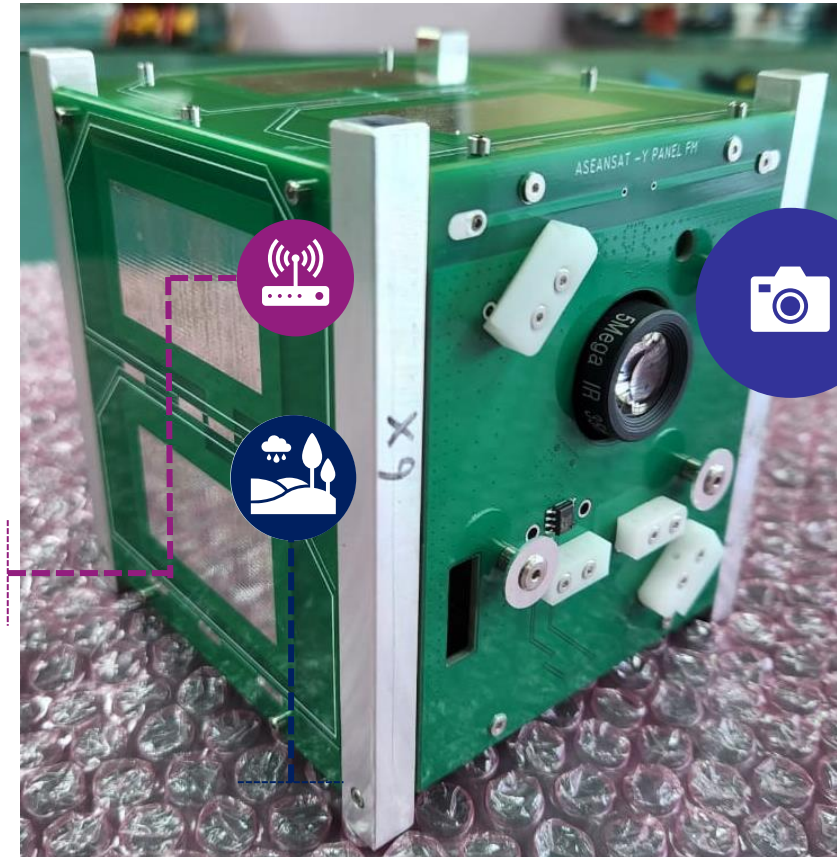
AGENCI ANGKASA MALAYSIA

**Main Mission:  
Earth Observation Mission**

High ground resolution camera payload

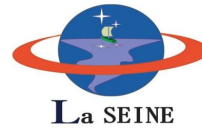
## ASEANSAT:

- **Resolution:** 2592x1944 pixels array (5 MP)
- **Spatial:** GSD ~16 m @ 400 km
- **Spectral:** RGB ( $\lambda$ : 0.4 – 0.7 nm)
- **Radiometric:** 8 – 10 bits image data
- **Temporal:** 4 ~ 6 times/day (6~8 minutes/pass)
- **Swath:** FOV ~6° (41.5 x 31 km)
- **Size** ~360 MB
- **JPEG** compression

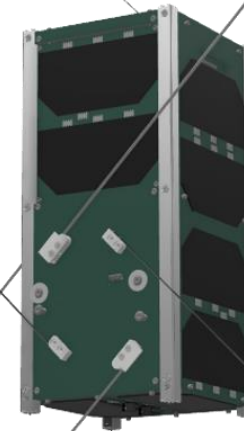


# BIRDS-X

## Kyutech(Japan) collaboration with ACCIMT(Sri Lanka)



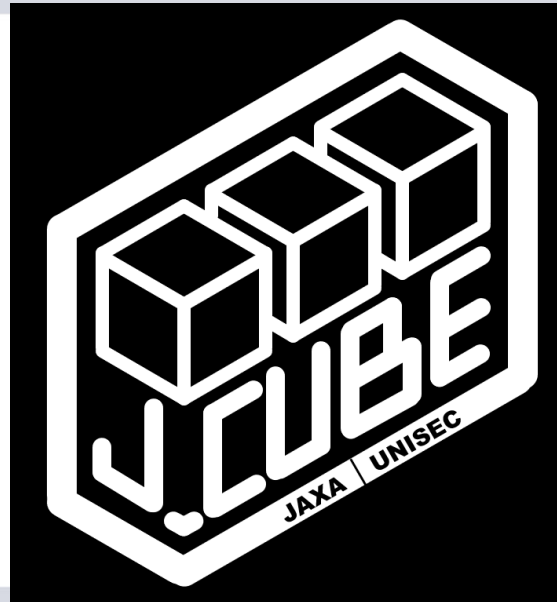
<b>Goal</b>	Bring diversity to the space sector and democratize the usage of space
<b>Emphasis</b>	Promotion of the satellite usage and Amateur Radio Community
<b>Stakeholders</b>	Kyutech with funding from ARDC
<b>Missions</b>	<ul style="list-style-type: none"><li>▪ APRS Payload competition</li><li>▪ APRS student mission</li><li>▪ GT competition</li><li>▪ UHF</li></ul>
<b>Satellites</b>	One 2U Satellite based on BIRDS bus
<b>Approach</b>	Lean Satellite
<b>Team</b>	Students
<b>Operation</b>	Use of BIRDS ground station network





**Why don't you try to join  
J-Cube initiative?**

# Thank you for listening



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